

(*Veterinary Series, No. 16.*)

THE
AGRICULTURAL LEDGER.

1895—No. 24.

OXEN.

[*DICTIONARY OF ECONOMIC PRODUCTS, Vol. V., O. 351—94.*]

THE CATTLE OF MYSORE:

Note by A. KRISTNAMANGAR, B.A., *and* VETERINARY CAPTAIN
H. T. PEASE, F.Z.S.

Other PAPERS that may be consulted :

Agricultural Ledger Nos. 19 of 1893; 14 of 1894; 7; 10; 12; 19 and 22
of 1895.



CALCUTTA:
OFFICE OF THE SUPERINTENDENT, GOVERNMENT PRINTING, INDIA.
1896.

The objects of THE AGRICULTURAL LEDGER are :—

- (1) To provide information connected with agriculture or with economic products in a form which will admit of its ready transfer to ledgers ;
- (2) To secure the maintenance of uniform ledgers (on the plan of the Dictionary) in all offices concerned in agricultural subjects throughout India, so that references to ledger entries made in any report or publication may be readily utilised in all offices where ledgers are kept ;
- (3) To admit of the circulation, in convenient form, of information on any subject connected with agriculture or economic products to officials or other persons interested therein ;
- (4) To secure a connection between all papers of interest published on subjects relating to economic products and the official Dictionary of Economic Products.
With this object the information published in these ledgers will uniformly be given under the name and number of the Dictionary article which they more especially amplify. When the subject dealt with has not been taken up in the Dictionary, the position it very possibly would occupy in future issues of that work will be assigned to it.

THE
AGRICULTURAL LEDGER.

1895—No. 24.

OXEN.

[*Dictionary of Economic Products*, Vol. V., O. 551—94]

THE CATTLE OF MYSORE.

Note by A KRISTNAMANGAR, B.A., and VETERINARY CAPTAIN H. T. PEASE, F.Z.S.

INTRODUCTORY.

Mysore has enjoyed, from a very early period, a just renown for her superior breed of cattle. The generally mild and salubrious climate of the plateau, with an extensive pasture on which cultivation had not made much inroad, favored cattle breeding, and attracted Gollas and other nomadic tribes from the north who brought with them excellent breeds, which being established for generations in the country and mixing with the indigenous cattle have improved them. Besides this the rulers of the Province took an active interest in the matter, maintaining great herds of breeding cattle and managing them properly, thus affording a good example to the people generally. The Royal herds must naturally have influenced cattle-breeding greatly in the parts where their grazing grounds lay as, no doubt, the village cattle got the services of the bull very often. The people could scarcely fail to profit by the lessons in breeding to be learnt from the Amrut Mahal establishment and were brought to recognise the importance of selection and segregation. Thus cattle-breeding flourished in the tract and good breeds resulted. Cattle constitute the life and soul of agriculture. They perform the whole of the agricultural draught work. The substance of a raiyat is usually rated by the number he owns and of the ploughs he works. Cattle are intimately associated in the domestic incidents of the people. The present of a cow with a few acres of land to the bridegroom is a notable part of the marriage ceremonial. The present of a cow and land is also a part of the Brahmanical obsequies. So useful are cattle in contributing to the existence and comfort of man, and so highly are they esteemed, that it is no wonder that in primitive times, and even to a certain extent at present, the people should venerate them as objects of worship. Cattle-breeding

History.

O. 551—94.

OXEN.	The Cattle of
INTRODUCTORY.	is pursued nearly all over the Province, except in the Malnad on the western parts of Mysore, which is covered with dense forests created by heavy and continuous rain fatal to cattle. Every raiyat almost is a cattle-breeder, and every village a cattle mart besides the great annual fairs.
Cattle fairs.	<p>These cattle fairs are an interesting feature, and the fact that they flourish all over the country is a proof that they satisfy a real want. Numbers of them are held at different times in different parts of the Province, and they constitute the centres from which the whole country is supplied with agricultural and draught cattle. Even the districts of the neighbouring British provinces depend in a measure on them for their cattle supply. The fairs are generally the ostensible accompaniment of some great religious festival. They follow each other in convenient succession, so that cattle not sold in one may be taken to another. The great cattle fair at Tiruvanamalai in the South Arcot District in the Madras Presidency is supplied mostly with Mysore cattle, or kindred breeds from the neighbouring taluks of the Salem District, which, it is understood, find their way even into Ceylon. A list of the most important fairs, with dates and the description of breeds sold, will be found on page 50. A brief account of one of the largest of them held in this Province may not be uninteresting. The scene of this annual fair is near the "Ghât," through which the Bangalore-Hindupur Railway debouches from the Dodbalapur tableland into the comparatively plain country beyond. The locality seems to have been selected on account of the large picketing ground it affords, of the supply of firewood which the scrub jungle offers, and the good water supply furnished by a rivulet that skirts the spot. For some miles around it there are very few inhabited villages, and this circumstance ensures plenty of room for the cattle to roam about. The fair is looked forward to with eagerness not only by those who have to buy and sell cattle, but also by pilgrims and sight-seers by whom it is crowded. "Dallals" or brokers in effecting transactions are an important institution here. For days together, strings of cattle and carts laden with provision for man and beast may be seen wending their way by almost impracticable cart tracks which, winding round hillocks and through valleys, lead up to this, for the time, great centre of activity. The spot, desolate all the year round except at this season, presents an animated scene. An area of about two square miles is crammed with cattle, carts, and men. On rough computation, it is estimated that 10,000 carts and 30,000 bullocks are collected at the fair. One remarkable circumstance is the entire absence of cows. Bulls of various breeds, ages, and colors, castrated and entire, are gathered there. Calves under one year are collected in a well-known corner. The predominant breed offered for sale is the <i>Bettadana</i>, or <i>Mahadeswara betta</i> breed. There are exhibited bullocks, suited for various purposes, for the plough, for heavy carts and light draught, and a few of these are priced as high as Rs 700 the pair. There are large-sized bulls fattened up and</p>
A Mysore Cattle fair described.	Q. 551—94.

Mysore. (A. Kriśnamangar and H. T. Pease.)

OXEN.

in excellent condition, with jingling bells round their necks and caparisoned with cloths of various and picturesque colors and designs, on which are wrought curious and fantastic figures. During the first days of the gathering the prices run high, and few transactions are effected except in the case of cattle destined for butcher's meat. In former times raiyats were superstitiously averse to selling cattle for slaughter, but ideas have, in this respect, undergone a change, and hundreds of agents may be seen successfully bargaining for the inferior sort of cattle intended for the slaughter-house. During this period of apparent inactivity, many a sidelong glance is cast at the desired purchase, and brokers are busily engaged in testing the pulse of demand and the number of cattle offered for sale. Towards the latter half of the week during which the fair lasts, transactions assume a brisk turn and thousands of cattle and many thousands of rupees change hands. The immense gathering then begins gradually to disperse.

INTRODUC-
TORY.

A Mysore
Cattle fair
described.

BREEDING.

Two descriptions of cattle exist side by side in Mysore, each serving its own particular purpose. The first and by far the most numerous of these is known as "*Nadudana*" are village cattle, these of small size, compact frame, and various colors. Every village in the Province teems with them. They constitute the bulk of the agricultural stock, and are the main source of dairy produce. The second is termed "*Doddadana*" (big cattle), and consists of the less numerous, but more efficient and valuable kinds of more uniform size and color; they are more often employed in conveying the traffic of the country than in agriculture, and are largely sold in cattle markets. The term "*Doddadana*" embraces the *Amrūt Mahal*, *Hallikar*, *Chittaldroog*, *Mahadeswara betta*, and their kindred breeds. Cattle of this description are owned only by well-to-do raiyats and breeders. Besides the professional breeder, every raiyat who has a little capital adds to his agricultural occupation that of rearing a few head of cattle. There is a convenient division of labor in this matter. There are parties who keep herds of cows and bulls for breeding purposes, mostly in the vicinity of grazing hills and lowland forests. Calves of one or two years are bought from them by raiyats, who rear them with much care for two or three years, and send them for sale at the cattle fairs. The whole breeding operations of the country are carried on by means of three descriptions of bulls:—

On Breeds of
Cattle in
Mysore.

- (a) choice bulls of the "*Doddadana*" breeds, kept in villages and home-fed, allowed to graze on village crops, or kept with the herds in the jungle pastures; these may be styled special superior breeding bulls;
- (b) calves of "*Doddadana*" bought when young and reared in villages, destined for agriculture or sale after castration, but employed as sires meanwhile; these may be styled casual good breeding bulls; they are moderately good, though

OXEN.	The Cattle of
BREEDING	<p>inferior to the first named for breeding, and, being permitted to cover before castration, make less efficient agricultural and draught cattle;</p> <p>(c) the numerous small-sized and more or less ill-shaped young males of "<i>Nadudana</i>," herding with the village cattle and breeding them down lower and lower; these may be styled "<i>Nadu</i>" bulls.</p>
<i>Nadudana</i> or village cattle	<p>"<i>Nadudana</i>" or village cattle are left entirely to themselves without any control and without any of those artificial restrictions by which alone a breed can be saved from deterioration when living under the artificial conditions in which they are placed by domestication. Seldom is any selection of breeding cows and bulls made with reference to their fitness for producing a vigorous and healthy progeny. The slaughter of cows is rare, and any cow, however deformed or diminutive, is allowed to breed. Inferior and defective bulls are generally uncastrated. The common practice of driving all the village cattle in one herd to graze leads to indiscriminate breeding. Most village cows are from these various causes so small and of such little value that the owners do not think it worth their while to get superior bulls to serve them. These bulls are not plentiful, and, when available, have to be paid for service, which payment the owner of a puny cow naturally grudges. In many instances, before the owner makes up his mind, the village bull forestalls him. Such are some of the difficulties which lie in the way of getting village cows served by good bulls. But the absence of such bulls is the prime cause of the deterioration of the breed from generation to generation. The recent order of Government for supplying <i>Amrut Mahal</i> bulls to taluks at the cost of local funds, is a move in the right direction. The difference in the condition of "<i>Nadudana</i>" in localities where inferior local bulls have been replaced by superior ones, is very striking. In some parts of the Bangalore and Kolar Districts, it is a common practice for two or more villages to join and subscribe for the purchase of a superior bull, usually one of the <i>Mahadeswara betta</i> breed is chosen. The bull is carefully selected and purchased when young. It is the common property of the villagers, and being allowed to graze on the crops in private fields, keeps in excellent condition. Such bulls accompany the herd during the day, but being accustomed to graze on the crops, seldom pay heed to the poor village common. In the hot season such bulls are fed on straw by any one of the common owners. It is not unusual for some well-to-do men, from motives of charity, it being considered a meritorious act, to purchase similar breeding bulls at their own cost and let them free. These bulls are also allowed free grazing by the villagers. They pay frequent visits to the neighbouring villages and attend to cows in season, keeping off inferior "<i>Nadudana</i>" bulls. In the French Rocks Sub-Division of the Mysore District and in the adjoining parts of the Tumkur District special bulls of the <i>Hallikar</i> breed are kept home-fed for breeding, a fee of from half to two rupees being charged for each cow served, higher</p>

Mysore. (A. Kristnamangor and H. T. Pease)	OXEN.
<p>fees being demanded for <i>Karadahalli Gujmaru</i> bulls. In the Arsikere, Tarikere, Kadur, and Channagiri Taluks, bulls of the <i>Amru: Mahal</i> blood are often met with; while in the southern and eastern parts of Chitaldroog, bulls of the <i>Chitaldroog</i> breed are found largely distributed in the villages. In other parts of the Province no special bulls are maintained, the breeding being mostly carried on by means of casual bulls of the <i>Mahadeswara betta</i> or other "<i>Doddadana</i>" variety.</p> <p>Great care and attention are bestowed on the selection of animals for breeding the "<i>Doddadana</i>." The conditions under which they are reared afford facilities for the regulation of breeding. Cows of this breed are sometimes kept in villages, home-fed and under shelter, in which case superior bulls or at least casual good breeding bulls are invariably secured to serve them. Herds of them are also kept in "<i>roppas</i>," or open kraals fenced with thorn, generally at some distance from villages, but sometimes near them; they always graze separate from village cattle and, as care is taken to exclude inferior village bulls, they are not liable to be bulled by them. Each herd has its own special bull, sometimes selected in the same herd, but more often to prevent in-and-in-breeding from some other herd. As the bull grows old and deficient in vigour, a young one is selected and kept in the herd to take its place. There are thus, in the majority of the herds, two bulls, one old and the other young. The young one in many cases acts only the part of a teaser. No sooner does it perceive that a cow is in heat than it approaches and keeps constantly attending on her. The cow for a time moves about in order to get free from the young bull, which, however, being very active, persists in following her until at last the cow seeks the protection of the older bull which the young one dare not approach and which then serves the cow. This habit is also observable in the <i>Amru: Mahal</i> herds, where two bulls are kept generally for a fixed number of cows. In some herds of the "<i>Doddadana</i>," a limited number of cows of the village breed is sometimes allowed to mix. Inferior cows are also occasionally introduced on payment, and kept in the herd for the purpose of sharing the advantage of being served by a good bull. On the banks of the river Cauvery in the Kankanhalli Taluk, some owners of the <i>Mahadeswara betta</i> herds, having lost considerable numbers of their stock during the prolonged drought of 1891-92, and wishing to replenish their loss, purchased a number of cheap village cows and mixed them with the remnants of the old stock, having their own pure-bred bull. This is a cheap way of forming new herds, but it takes ten to twenty years to raise the standard of the progeny to the larger size and value of the pure-bred specimens. It is said that the progeny second in descent generally attains all the qualities of the pure breed, or even if traces of maternal defects should linger in it, an animal third in descent, to a certainty, attains that standard of size, shape, color and efficiency. A transformation, therefore, from the village to "<i>Betta</i>" or any other breed, if it is</p>	<p>BREEDING.</p> <p><i>Doddadana</i> breeds.</p> <p><i>Doddadana</i> or big cattle.</p> <p>O. 551-94.</p>

Mysore. (A. Kristnamangar and H. T. Pease.)	OXEN.
<p>(19) short fetlocks and hard small hoofs with equal halves with a very narrow cleft between; a long shank is considered a weakness;</p> <p>(20) black skin, horns, muzzle, and hoofs;</p> <p>(21) thin skin covered with short and soft hair; blue and iron-grey colors are preferred;</p> <p>(22) a compact body, free from all unnecessary pendulous growths;</p> <p>(23) the animal should be sound in every way, symmetrical, of good temper and pure breed, and free from hereditary disease.</p>	BREEDING.
<p>The above points have reference both to strength and beauty. It is of course difficult to find all of them present in any specimen. To the selection of the cow, no special care or attention is bestowed, but the bull, considering the number of animals it is likely to influence, is most carefully selected. The main points looked for in cows are good size and length, shapely head and horns, broad hips and loins, and good whole color.</p>	Castration.
<p>Castration and segregation are the two means by which inferior bulls are debarred from breeding. The cows of the "Doddadana" cattle are valuable, being capable of producing high priced animals. Contamination of them by inferior blood, even though of the same herd, is carefully prevented. Herds are therefore not only kept away from village bulls, but are also annually weeded of all their own young males, before these develop any breeding propensity. The bull-calves, for which there is always a keen demand, including sometimes even calves four months old, are sold to purchasers who take them away and rear them. Such as are not so sold are either castrated early and kept in the herds, or more often taken home and trained for work. In some villages where good bulls are available, all the malformed and small ones are either castrated or separated from the general herd of cows, in which latter case they are kept with the working bullocks and like them homed. The latter method has the advantage that careful attention is paid to the hand-feeding of calves. Segregation is more often resorted to than is castration, for, as almost all male stock, whatever their shape and size, are ultimately destined for agriculture, their castration can by this means be delayed till they have six teeth. In some very rare instances bulls have a gunny-bag sack tied up so as to enclose the sheath and render covering impossible.</p>	Segregation.
<p>The importance of preventing immature animals from breeding and of delaying breeding till the animals attain mature years are known and appreciated, but they find no practical application in the rearing of village cattle. Even as regards the "Doddadana," they are not invariably observed in the case of cows in herds, though when valuable cows are kept in houses the owners prevent them from breeding till they are of adult age, notwithstanding their coming in season meanwhile. In the Amrut Mahai Department care is taken to separate and leave behind all young heifers when the herds are driven to tracts where the conditions of soil and fodder would induce their coming prematurely into season. In the case of male animals</p>	Immature animals not always prevented from breeding.

OXEN.	The Cattle of
<p>BREEDING.</p> <p>Season for Cattle breeding. Conf. p. 8.</p>	<p>of the "<i>Doddadana</i>," the rule regarding the breeding age is observed whenever possible and if adult bulls are available. The practice of having two bulls in a herd, one young and the other mature, and consequently stronger, affords some guarantee against the former impregnating cows.</p> <p>There are three different periods of the year in which cows usually come into season, April and May, when the early showers fall; October, November, and December, when pasture is at its best; and January, February, and March, when cattle are fed on the refuse of the thrashing-floors. If the early showers are plentiful, grass springs up in abundance and affords fresh pasturage to the grazing stock, which under that stimulus come in season. During recent years early rains have been more or less light, and very little grass has grown under their influence, more especially in the eastern and northern parts of Mysore, where most cattle-breeding is carried on. This period has therefore had no influence on cattle-breeding except towards the west. Even here, the cows being ill nourished during the preceding summer do not generally evince any propensity to take the bull after the early showers. That cows are not impregnated in great numbers at this period of the year is not without some advantage, for the time of calving in the case of cows so conceiving coincides with the following hot season when the cow and the calf suffer from scanty pasture. The second period, known locally as the "<i>Dipavali</i>" and "<i>Sankranti</i>" season from festivals of the same name held at that time, is the season when most cattle in the Province, having had time to recover from the depressing effects of the previous summer, and revelling in pasture which is then in its most abundant and vigorous growth, come into season. Impregnation in this season has the advantage that a long spell of good weather follows while the cow is in calf and the calving time falls in the early part of the succeeding rainy season. Instances of cows coming into season in January and February (known as the "<i>Hakkal mev</i>" period) are rather rare, nor can the season be said to be a very suitable one, inasmuch as dry weather follows immediately after conception.</p>
<p>Food given to breeding cattle.</p>	<p>As a rule no special food is given to cows or bulls during the breeding season, except in the French Rocks Sub-Division and its adjoining taluks of the Tumkur District, where breeding bulls of the <i>Halikar</i> breed are given strong nourishing food to sustain their strength. Casual breeding-bulls of the "<i>Doddadana</i>" are similarly treated in some places. Valuable cows kept in villages are likewise given specially nourishing food to improve their condition and to induce sexual excitement. But it is possible that a cow may become too fat and for this reason fail to conceive, though served by the bull on each occasion of her frequent seasons. In such cases all special food is stopped, and even the daily allowance of the usual food is curtailed for a few days or weeks after the animal is covered, in order that her condition may be reduced and conception aided. Ill-nourished and badly kept cows, after failing to conceive in the ordinary course, sometimes come into irregular heat which recurs even</p>

Mysore. (A. Krishnamangar and H. T. Pease.)	OXEN.
<p>after they are served. As a remedy for irregular heat and failure to breed, bark of <i>Jatropha Curcas</i> is crushed and mixed with curd and three hornfuls (about half a seer measure) of the mixture administered to the cow immediately after she has been bulled.</p>	BREEDING.
<p>The heat lasts for a day or two and then ceases. If the cow is not served by the bull, it is said that at least sixteen days elapse before she comes in season again. Some plethoric cows which exhibit no desire for the bull are yoked in the plough and worked in order to bring them into season. As a rule, cows though in good condition rarely come into season in very wet weather. In parts of the Chamrajanagar Taluk (Mysore District) partially fried oil-cake of <i>Guizotia abyssynica</i> or its oil is given as a stimulant to cows when they fail to come into season. Another way to bring about sexual excitement is to give the cow three hornfuls of fish spawn and bark of <i>Capparis zeylanica</i> well ground and mixed with milk. In the Nagamangala and Kankanahalli Taluks and in all those places where valuable "<i>Doddadana</i>" are reared, bull-calves are often weaned earlier than usual to meet the demand for them. When the calf is thus weaned and the cow is not milked she comes into season sooner, more especially if the weather happens to be propitious. Breeders in those parts often resort to this measure as a means of getting as many calves as possible from their cows. Cow-calves generally not being sold are not thus early weaned. At Karadahalli (Nagamangala Taluk) an instance was brought to notice of a calf only seven days old weaned from the mother which was said to be a very valuable cow. The calf was fed upon milk drawn from other less valuable cows. Save in these exceptional cases, calves are generally left with the mother till she runs dry.</p>	<p>Season for Cattle breeding. Cowf. p. 8.</p> <p>Weaning of calves.</p>
<p>In connection with the subject of breeding, there are certain facts connected with the age at which the first conception occurs in different cows and the interval which they pass in calving afterwards which deserve to be noted.</p>	
<p>Some cows take the bull before they cut two teeth, others at two and some others again later, the time extending up to one or two years after the animal has a full mouth. This is said to depend on the family to which they belong. These families are classed as "<i>Varshakandi</i>" (calving annually), "<i>Ikkandi</i>" (calving biennially), and "<i>Mukkandi</i>" (calving triennially). In the case of biennials and triennials the intervals are sometimes narrowed more or less within a limit of six months. Cows of the first of these classes take the bull at an early age, i.e., at about two teeth, those of the second class at about four teeth, and those of the third class at about six teeth and thereafter, provided no exceptional circumstances influence and alter the natural course. For example, a "<i>Varshakandi</i>" cow may temporarily become an "<i>Ikkandi</i>" or even a "<i>Mukkandi</i>," and an "<i>Ikkandi</i>" cow may similarly become a "<i>Mukkandi</i>," owing to bad condition in seasons of drought, but the effect is not permanent, as it resumes its normal regularity when the cause of the aberration is removed. But the converse of this does not happen, and a cow of the</p>	<p>Age at which cows become fit for breeding.</p>

OXEN.	The Cattle of
<p>BREEDING.</p> <p>Milking periods of different classes vary.</p>	<p>family calving at the longer intervals does not pass into families calving at the shorter intervals. The most prevalent class is that of cows calving annually. In making their selections experienced purchasers invariably prefer "<i>Mukkandi</i>" calves if they can find them and are willing to pay high prices for them. Both the calf and the cow of this class are bigger, better made and stronger than the other two, "<i>Ikkandies</i>" being better than "<i>Varshakandies</i>." The reason for this is obvious. The milking periods of these classes of cows vary, those calving at longer intervals continuing in milk longer. Making allowance for good or bad keep and individual peculiarities, "<i>Varshakandies</i>" continue in milk for 4 to 5 months, "<i>Ikkandies</i>" for 12 to 16 months, and "<i>Mukkandies</i>" for 21 to 27 months, though in the case of the second and third classes it is noticed that during the last 3 or 4 months the yield is gradually reduced, the cow milking but once a day. Calves of these latter are nourished longer upon the mother's milk and grow better. The long period of rest after calving especially after she runs dry, enables a "<i>Mukkandi</i>" cow to regain the strength and vigour lost at each pregnancy. "<i>Varshakandi</i>" cows which usually suckle their calves from 3 to 5 months, are sometimes liable to a double drain, nourishment being drawn both by the calf at foot and by the developing foetus in the womb, leaving to the cow little time to repair the loss. Common salt, or feeding on grass growing in salt lands, has been known to induce early maturity and yearly calving. For example, most of the cows in the numerous herds of cattle in the Challakere Taluk of the Chitaldroog District where there are extensive salt tracks in pasture lands, are "<i>Varshakandies</i>" and calve for the first time at 3½ years. These cattle are generally smaller by one or two inches than "<i>Ikkandi</i>" cattle. It is when driven to pastures in such saltish regions that young heifers of the <i>Amrut Mahal</i> herds not required to breed are separated and left behind.</p>
<p>Influence of sire on the dam.</p>	<p>With regard to the influence of the parents on the calf, opinions differ. The general belief is that the male parent chiefly influences the offspring. It is also believed that the bull in the immediate view of the cow when she is bull-dressed impresses the calf. Barren cows generally keep in good condition. Pure and well-bred bulls seek only cows in heat, and it is only ill-bred and young bulls that pursue and attempt to cover cows not in season, and even those in calf. Bulls at two teeth are active and full of youthful vigour, but much less capable of impregnating; at four teeth they are lanky and languid, but better fitted for fecundating. Both these are too young to breed satisfactorily, and while suffering constitutionally themselves, produce weak progeny. From six teeth up to the age of about 12 years they are of established vigour and breed successfully without suffering from constitutional disorders, and their progeny is strong and of good-size. From about the 13th year they begin to decline, and their breeding powers altogether cease at about 16.</p>
<p>Age at which bulls come into condition.</p>	<p>The management of cows during pregnancy does not vary from that at other times, except that in large herds such cows are grazed separately. At the time of parturition man's efforts are confined to assisting nature to</p>
<p>Management of cows in calf.</p>	

Mysore. (A. Kristnamangar and H. T. Pease.)

OXEN.

bring about a quick and easy delivery. After being dropped, the calf is cleaned and the soft and ugly growing ends of its hoofs are trimmed, and it is allowed to be licked by the cow. In cases of irregular parturition, such as when a calf is turned the wrong way or when it is dead in the womb, there are expert men scattered all over the country who are called in.

FEEDING.

FEEDING.

The greater part of the cattle of the Province are maintained by grazing during the day and home feeding at night, while considerable numbers are supported either purely on pasturage or are chiefly home-fed.

All large herds of cattle, whether of superior or inferior kinds, which are usually kept in the open or in partially covered pens at night, are generally maintained on pasturage alone. Their numbers are too great to admit of their being easily housed or fed at night. Such cattle therefore vary in condition with the season, being half starved in the dry weather and well fed in the rainy and cold months, except when they have provided for them, as in the case of the *Amrut Mahal* cattle, their hot weather and their cold weather "*Kaals*." As a rule, large herds of cattle are found only where grazing is extensive. In the earlier days of Mysore Forest Administration the almost unrestrained immunities which the raiyats had either openly or clandestinely been enjoying, were virtually withdrawn, and this measure had a prejudicial effect on cattle-breeding. The principle that the cattle wealth of the country is far too important to be thus dealt with, has in recent years been recognized, and restrictions have been relaxed, cattle being allowed to graze in many Government forests or parts thereof upon the payment of a fee of two to four annas per head. It is not now unusual for cattle-owners in the plains to send their herds to distant Government forests to graze from July to December or January, when they have to be withdrawn on account of the heat, diminished pasture and scarcity of water, but chiefly owing to fire protection measures. Cattle are let out from "*Roppas*" early in the morning. They bask about the place till about 7 or 8, when the graziers having had their breakfast are ready to lead them off to graze. They are watered once or twice a day. In the hot weather they are driven out to graze much earlier and are watered twice a day, generally at midday and in the evening, or when water is at a distance in the morning and in the evening, on their way to and from the grazing grounds. They usually rest under the shade of trees for two or three hours at midday when the sun is hottest. Cattle are guided by the voice of the graziers. A grazier of the *Amrut Mahal* Department is able to collect a herd near him by a peculiar call addressed to them from a distance. It is not unusual for cattle scattered over a large area of jungle to gather and trot to their distant home of an evening at a signal from the attendant.

All village cattle, except valuable bulls and cows, such as may be the objects of special care and attention, collect together every morning at an

The Agricultural

GEN.	The Cattle of			
EDING.	appointed place, and are then driven out to the village "Gomal" or common where they are grazed, getting their midday repose and watering in the same manner as "Roppa" cattle.			
r quality grazing land.	Most of the pasture lands are very indifferent as to soil and produce but scanty supply and innutritious grass even in the best of seasons. In the hot weather or during drought the term "desert" might almost be applied to them. Cattle depending entirely upon village pasture must thus suffer in the hot weather, and are therefore fed at home at night. The dairy produce of cattle grazing on ordinary jungle and hill pasture is somewhat deficient in the richness and flavor which characterises that of cattle in salt tracts, such as those of Challakere. The grass most extensively found in all "Gomal" or pasture lands is the "Karadaga", otherwise called "Vunaga," <i>Heteropogon contortus</i> .			
The following is a list of grasses commonly found growing in different localities in "Gomal" or pasture lands and also in the arable lands of the country :—				
Grasses used as fodder.	Number of class.	Vernacular name.	Botanical name.	Description of localities in which it grows.
	1	<i>Bodhihullu</i> two varieties; broad bladed, narrow bladed,	<i>Andropogon</i> Sp.	On poor and dry ground, on steep sides or hill tops at high elevations.
	2	(a) <i>Vunaga</i> or <i>Karadaga</i> two kinds.	<i>Heteropogon contortus</i> . <i>Aristida cærulescens</i> . <i>Aristida cærulescens</i> var.	Elevated, dry, loamy soils, also in hard, stony grounds and shallow soils overlying beds of gravel and stone generally very poor and dry.
	(b) <i>Hanchi</i> . . .			
	(c) <i>Sanahanchi</i> . . .			
	3	(a) <i>Kachi</i> . . .	<i>Andropogon Schoenanthus</i> .	In level tracts of dry red loams or soils overlying beds of laterite gravel; practically in same localities as No. 2, but prefers somewhat open and more reddish soil.
		(b) <i>Gantukachi</i> . . .	<i>Anthisteria ciliata</i>	Soils containing considerable organic matter.
	4	<i>Mani</i> . . .	<i>Chrysopogon squamosus</i> .	In low-lying stiff soils and also in elevated but badly drained level tracts of clay soil which are very retentive of moisture.
	5	(a) <i>Ganjlagarihi</i> . . .	<i>Andropogon Bladhii</i> . <i>Pennisetum macrochloa</i> . <i>Chrysopogon cærulescens</i> .	In all well-drained grounds, where the soil is fairly rich.
	(b) <i>Naribala</i> . . .			
(c) <i>Hulimise</i> . . .				

Mysore. (A. Kristnamangar and H. T. Pease.)				OXEN.
Number of class.	Vernacular name.	Botanical name.	Description of localities in which it grows.	FEEDING.
6	<i>Tungi</i> two kinds : (a) The bulbous variety (b) Fibrous rooted variety	<i>Cyperus rotundus.</i> <i>Cyperus compressus.</i>	In low-lying moist sandy soils, especially those once under cultivation. Seldom on high-lying hilly lands.	Grasses used as fodder.
7	<i>Sunti</i> , the ginger grass.	<i>Panicum repens</i>	In low paddy fields lying fallow. Seldom on high-lying hilly lands.	
	(a) <i>Noje</i>	<i>Pennisetum Alopecurus.</i>	In marshy grounds water logged during a great part of the year, but surface open to air.	
	(b) <i>Darbhe</i>	<i>Saccharum spontaneum.</i>		
9	<i>Yambhu</i>	<i>Pennisetum indicum.</i>	In water.	
10	(a) <i>Garike</i>	<i>Cynodon Dactylon.</i>	In rich soils and where manure collects. It is also found to grow in all well-drained soils once under cultivation.	
	(b) <i>Porehullu</i>	<i>Panicum prostratum.</i>		
11	<i>Marawadi</i>	<i>Anthisteria umbellatus?</i>	In rich loam capable of retaining moisture, and recently thrown out of cultivation.	
12	<i>Pulambrahullu</i> , several kinds.			
	(a) <i>Parangi akkabahullu</i>	<i>Trachys mucronata?</i>	In lands ploughed and manured every year and fairly moist.	
	(b) <i>Manchakalu</i>	<i>Cloris barbata?</i>		
	(c) <i>Sannatapari</i>	<i>Panicum tenuiflorum.</i>		
	(d) <i>Konanatala</i>	<i>Eleusine ægyptiaca.</i>		
	(e) <i>Huchusave</i>	<i>Panicum prostratum.</i>		
	(f) <i>Huchuharaka</i>	<i>Panicum colonum.</i>		

Grass accustomed to grow in good soils does not grow in bad soils ; on the other hand, grass whose habitat is bad soils may grow in superior soils, only seeking there such spots as most fulfil the conditions congenial to its growth. The most prevailing grasses in pasture lands are those of class 2. Nos. 1, 2(b), 2(c), 3(a), 3(b), 5(c), 6(a), 6(b), 8(a), 8(b), 9 are either fibrous, woody or pithy and contain little nourishment. Some of these are moreover of a pungent taste, and on that account are not preferred. All these, except Nos. 6(a) and 6(b), are available in the hot season, though in a state of maturity, when they are comparatively useless as fodder. Nos. 2(a), 4 and 7 come next in order in the ascending scale of nutrition,

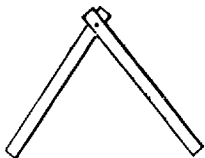
Grasses commonly found in grazing lands.

The three scientific names marked ? cannot be traced—Ed.

OXEN.	The Cattle of
FEEDING.	<p>the last-named being somewhat pungent. The little nourishment these grasses possess is still further diminished when they flower. Nos. 5(a) and 5(b) are nourishing grasses, but are of diminutive growth and are grazed down before the hot weather; 5(a) is slightly pungent. In point of palatability, class No. 11 is better than No. 10, and No. 12 better than both of them. No. 10(a) is believed to be the most nourishing of them all though somewhat unfavorable to the secretion of milk. All grasses are freely grazed when young and succulent. "Vunaga" or "Karada" or spear grass is avoided when it is in flower, for the awns are woody and needle-like and pierce the mouth. It is eaten after the spear heads ripen and fall off, and is the main source of hot weather fodder, though it then affords but little nourishment.</p> <p>The crying want of the country is a supply of fodder during the hot months. "Gariki" or <i>Hariyali</i> or <i>Dhoob</i> grass grows in great luxuriance in the Mysore Province when properly cultivated and yields in a year no less than three crops convertible into the finest hay. It is further a fact that seeds of other good grasses can be sown in the European fashion and produce a thickly grown crop from which the best of hay can be made.</p> <p>As for providing for the wants of the cattle of the people at large, it would be a hopeless task. Many agriculturists have grazing lands of their own, and in addition are gradually turning portions of their fields into pasture. This is a move in the right direction, and further improvement in this respect may be safely predicted as the price of cattle goes on increasing. At present so many cheap cattle are procurable that self-interest does not dictate such feeding of them as in the case of more highly priced animals.</p>
Valuable cattle generally home-fed.	<p>All valuable cattle are, as a rule, home-fed, the fodder generally supplied to them being green grass chiefly collected in cultivated fields in the rainy weather, and straw of cereals in other seasons of the year. Cattle, when off work, and home-fed animals are held in ropes and grazed in rented pasture reserves or on the borders of fields. Fodder as such is seldom grown, except in parts where <i>Sorghum</i> cultivated separately or in lines with <i>ragi</i> is given to cattle green before earing. This is a most nutritious food, and cattle fed thereon soon get into very good condition. It is also raised in many parts by irrigation to be used as fodder in times of scarcity. In a few places in the case of fine bulls they are allowed to graze down crops of horse-gram. Among the different kinds of dry fodder <i>ragi</i> straw is sweet and nourishing and far superior to paddy straw; <i>cholam</i> (<i>sorghum</i>) stalks are nourishing, but being hard they are often chopped into pieces for use. Hay is but seldom made, and ensilage is unknown.</p>
Special foddere.	<p>Besides the above usual kinds of feed cattle are often given special foods. These are generally pulses, such as horse-gram, cow-gram and pigeon-pea and their husks or pods, oil-cakes of <i>Guizotia abyssynica</i>, gingelly and ground-nut, cotton seed and cereal grains such as <i>cholam</i>. Oil-cake</p>

Mysore. (A. Krishnamangar and H. T. Pease.)	OXEN.
<p>of <i>Gnizotia abyssynica</i> is believed to be heating and is generally given with horse-gram. Ground-nut cake increases the yield of milk, and so does cotton seed, which is very nourishing. It is soaked in water and often ground before giving. Soaked horse-gram is crushed and given to milch cows and calves. It is boiled when given to cart-bullocks. Sometimes it is given fried and crushed. Cow-gram is always soaked and crushed before giving. <i>Cholam</i> is crushed and given. It is not unusual to save up whatever remains of the day's food and to mix with it a large quantity of water, often water in which rice has been washed, rice-bran, <i>conjee</i>, unutilised curds, oil-cakes, etc. This mixture turns sour and with the addition of some salt is much relished by cattle. Milch cows and working bullocks are often given this cooling drink. Special foods are mainly had recourse to only in the hot season when fodder is scarce.</p>	CASTRATION.
<p style="text-align: center;">CASTRATION.</p> <p>The importance of castration in cattle-breeding is fully understood by the professional breeders and raiyats generally. All male animals except such as may be kept for breeding purposes are invariably castrated.</p> <p>The age at which calves are emasculated differs in various parts of the Province, though over the greater portion of them are castrated at about the close of the third or the fifth year, preferably at the latter age when the animal has put forth six permanent teeth. In the <i>Amrut Mahal</i> Department managed under European supervision early castration is the rule, and calves are castrated at two years or thirty months. Among private breeders castration of animals before they cut the first two teeth is rare. Castration when the bull has four teeth is supposed by many breeders to be too early, whilst others prefer to castrate their bulls at that age. The difference in practice is probably founded on local usage or peculiarities of climate.</p>	Age at which practised.
<p>In favor of early castration there is the fact that the operation is easier and attended with less pain and danger than in the case of later castration. Early castration would seem to cause a tighter carcass, less draught power, but more speed than late castration. Animals of the latter class have however a better capacity for heavy draught, especially in ploughing stiff black cotton soils. <i>Aprpos</i> of this, the remarks of Mr. Wallace may be quoted:—</p> <p>"In my opinion, this (early castration) alone, carried out in direct opposition to native customs, which have been built up as the results of a large experience when animals are wanted for heavy draught, is quite sufficient to account for all the so-called degeneration, which fortunately however would be confined to the bullocks or export produce of the herd. Extending as it does over so many years, I should assess the pecuniary loss to Government on the Amrut Mahal Cattle Farm, resulting from this blunder alone, the direct result of want of technical knowledge, at not less than some hundreds of thousands of pounds sterling."</p>	Advantages of early castration.

OXEN.	The Cattle of
CASTRATION.	<p>It must however be stated that other authorities are directly opposed to Professor Wallace's opinion on this point, and that in Harriana, where the best cattle in Northern India are bred, the operation is carried out early by the people.</p>
Season best adapted for the purpose.	<p>The period of the year considered most suitable for castration is the season of plenty, from October to February, when the weather is bracing and cool and when there is an abundance of fodder and water available. The time for operation is generally in the cool of the morning.</p>
Different modes practised.	<p>There are three different methods by which castration is effected; 1stly, by crushing the testicle, or the spermatic cord, or both; 2ndly, by causing a wound at a point between the two lobes of the scrotal sack and allowing maggots to form and eat up the glands and then healing the wound; 3rdly and lastly, by cutting open the sack and removing the testicles. Except under the second method the animals are invariably thrown on some soft ground in the same manner as when being shod. When adopting the first method the most prevalent practice is to pull the scrotum well out, to push one of the testicles up and secure the other between two short and stout sticks which, tied at one end and free at the other, as shown in the margin, can be closed or drawn together. When the testicle is thus held firmly, as if in a vice, its apex is turned up by gently turning the sticks, and it is pressed by the hand vigorously down against the sticks, till all the hard tissue is broken up and reduced to a pulpy mass. The second testicle is then similarly treated. To ensure the success of the operation, particular care is taken to apply the pressure on the apex and vertically downwards. In fact success may be said to be dependent in great measure on skilful manipulation. The operation should not be performed when the animal is low in condition. In this operation great care should be taken that no pressure is accidentally put upon the rudimentary teats and their immediate vicinity. Any inattention to this precaution results, it is said, in instantaneous death, or in tetanus setting in, eventually ending in death even if life should be prolonged for a day or two. Another device occasionally adopted is to tie a string tightly round the scrotal sac, just above the glands and to strike them with a hammer or a stout stick, so as to crush them.</p> <p>There is another mode by which the spermatic cord is maimed and crushed, <i>vis.</i>, by placing the cord (at a safe distance from the rudimentary teats) on a thin iron rod and giving it one or more sudden blows with a small hammer. This method, though it leaves the testicles undisturbed, ensures their withering away in the course of a few weeks. In some localities the operation of crushing the spermatic cord is resorted to in addition to crushing the testicles to ensure thorough success.</p> <p>There is again another manner in which castration by crushing is effected</p>



Mysore. (A. Kristnomangarand H.T. Pease.)

OXEN.

ed. A string is tied tightly round the cord just above the testicles and is pulled forcibly with a strong jerk, crushing and disorganising the cord and, partially, also the testicles.

CASTRATION.

The second of the two methods above enumerated, namely, that of destroying the glands by maggots, is happily limited in extent. The maggots fall off about the eighth day and a second set is allowed to form. When at the end of ten or twelve days the testicles are completely destroyed, the maggots are got rid of by the application of the milk of the banyan tree and turmeric powder to the wound. Other stuffs, such as kerosine oil, or slaked lime and green tobacco leaves ground together, are also used to remove the maggots.

The third of the three systems already referred to is in vogue in the *Amrut Mahal* Department and among those breeders who follow its example in improved methods of breeding. In that Department the slit is made with a knife; common breeders, however, sometimes use a piece of quartz with a sharp edge for making the opening. When the testicles are thus got at, a ligature of fine thread is applied to the arteries to prevent bleeding, and they are removed. Some dry cow-dung powder is placed in the sac and the wound is either stitched or tied up. It heals in about twenty days, cow-dung powder being said to be a very good antiseptic. Tar or "neem" oil is sometimes applied externally to prevent maggots from forming. In some of rare instances one of the testicles is absent not having descended into the scrotal sac. It has therefore to be brought down by expert manipulation before the operation can be completed.

The night previous to castration the animal is given about 4 ounces of gingelly oil or oil of *Guizotia abyssynica* with two or three eggs; and after the close of the operation on the following morning, a drink of two or three hornfuls of buttermilk mixed with onions and a small quantity of turmeric pounded together is administered. In some localities two hornfuls of a mixture of cow's milk, *ghi* and asafoetida is given immediately after castration, and is followed for a week or so by a drench made from the juice of the leaves of heart-seed mixed with buttermilk and given every morning. Various means are at the same time employed for reducing the inflammation of the scrotum including the swimming of the animal every morning for a week from the second or third day after castration. Cold water is dashed on the parts; the animal is bathed in cold water; and other applications are not unusual, such as cow-dung or the juice of the leaves of "*Kachi*" or of *Datura* (thorn apple). The animal has high fever for a day or two after castration and does not feed till it subsides. It takes from twenty days to a month to recover from the operation. Various kinds of nourishing and fattening food are given for a more or less lengthened period afterwards. When the castrated animal is not valuable or when the owner has a number to attend to, it is generally given nothing, but some straw and green fodder.

Preparatory treatment.

OXEN.

The Cattle of

MANAGEMENT.

MANAGEMENT OF CATTLE.

Cattle bred in great numbers, both "*Doddadanās*" and "*Nadudanās*" are more or less neglected as regards protection from the weather. They are grazed during the day and are driven for the night into open enclosures exposed in bad weather to rain, wind, and dew. The droppings are seldom removed from the enclosure except near cultivated lands where they are of value as manure. Young calves are sheltered in sheds provided for the men tending the herds. This treatment has, to a certain extent, the effect of hardening the stock and improving the breed as it kills off the weaker animals. In the dry months their lot is more comfortable. The accumulated droppings dry up and afford a sort of soft powder bedding. Careful breeders select dry hard ground for "*roppas*," and change them from time to time. Home-bred cattle and those kept for draught are kept in sheds or in the houses of the owners. It is not unusual to find a raiyat and his family sleeping in the same apartment with his oxen. In the open "*roppas*" cattle often fight and horn each other badly. Feeding troughs made of stone slabs or planks are often provided in houses for economising the fodder. Well-to-do and intelligent raiyats have their sheds flagged with stone slabs inclining towards a tub or pot for catching the urine. In some parts the dung is collected, dried and spread under the cattle for bedding, and absorbing the urine becomes valuable manure. The conditions of the tract known as the Malnad are peculiar and are very unfavorable to cattle. These tracts get a rainfall varying from 60 to 160 inches a year. The consequent excessive moisture is prejudicial to the health of the cattle, while the wet or rice cultivation there unduly taxes their vitality. One usage to which cattle are subjected is of all other conditions most unfavourable to their well-being. "*Supari*" cultivation, which constitutes the chief wealth of the Malnad, requires heavy manuring. Leaf manure has, by experience, been found to be indispensable. Raiyats in the Malnad spread a layer of green leaves in the cattle-shed and tether their cattle thereon, so as to receive the droppings. From day to day additional layers of leaves are spread; this goes on for a week or so till the whole mass of leaves soaked in and mixed with cattle urine and manure is removed and deposited in the manure pit. This goes on through the greater portion of the year. With work in excessive wet and rain during the day, and this treatment in their resting place at night, the cattle sustain such wear and tear and mortality, that one of the most costly and frequently recurring items of the Malnad raiyats' expenses is the purchase of bullocks. Added to this is the very coarse and innutritious pasturage of these dense forest regions where the grass seems to be deprived of its usual nourishing quality by the excessive rainfall. The cattle of the *Kacha Gowlies*, which will be referred to further on, are an apparent exception to this rule, for they thrive in the Malnad; it has, however, to be observed that the bulk of their cattle consists of buffaloes which delight in moisture and can subsist on coarse grass.

Manner of obtaining leaf manure injurious to the cattle.

Mysore. (A. Kristnamangar and H. T. Pease.)	OXEN.
<p>It may not be uninteresting to give here a brief account of "<i>Kacha Gowlies</i>," a nomadic tribe owning herds of cattle, who have in recent years immigrated into the Malnad parts of Mysore. They speak KANARESE and are hardly able to converse in MAHRATTA. They encamp in jungles seldom visiting villages or towns, except for the purpose of procuring provisions or selling their dairy produce. They shift from jungle to jungle. They are primitive in their habits and live in low huts or other temporary structures. Their means of living is derived from their cattle, chiefly buffaloes. Their principal dairy produce is butter, which commands a ready sale. They have introduced a peculiar breed of cows and buffaloes from Goa and the Konkan country. They take great care of their cattle which are healthy and give plenty of milk, unlike the generality of the Malnad cattle. Owing to their extreme simplicity, and to the fact of their possessing some money, they are occasionally robbed by professional thieves and dacoits and spoiled by petty officials, but they are protected by the Forest Department; for, though they do some damage, yet they abide by rules: and doubtless in time their herds will increase to the great benefit of a considerable tract of country where other cattle do not thrive at all.</p> <p>Cattle are seldom provided with "<i>jhoals</i>" except valuable cart bullocks which are provided with coverings of gunny bags, or coarse home-made "<i>kumbles</i>" or cloths. Where mosquitoes abound, it is usual to smoke cattle sheds at night as a means of keeping them off.</p> <p>When green fodder is plentiful cattle sometimes suffer from an abnormal papillary growth on their tongue, which prevents them from feeding and drinking as usual. Various remedies are employed to remove this growth. One of the commonest means is to rub the tongue briskly with a mixture of common salt and turmeric powder. A thick band of straw enclosing a quantity of common salt is sometimes placed in the mouth of the animal and the ends of it taken up and tied behind the horns. The salt melting with the saliva causes the animal to work the tongue, and the friction thus induced brings on relief or cure. Another method is to spread a thin layer of powdered common salt on the rough surface of a flat stone and to induce the animal to lick it. Cattle that have an opportunity and are in the habit of licking earth-salt are not liable to such abnormal growth on the tongue, and even if they do get it, are quickly cured. Salt is not usually given in the hot season, as it is supposed to reduce condition. It is given only to working bullocks and valuable animals kept in the villages. When pasture is plentiful it is usual in some parts of Mysore to give the working bullocks and valuable bulls a drench of warm <i>ragi conji</i> mixed with about $\frac{1}{2}$ of a seer of melted fat either of the pig or goat, or when that cannot be procured, of <i>ghi</i>. On the day they are given this drench they are allowed only a small draught of water, and that late in the day. The animals thus treated are rested for a period of not less than a week. This treatment is adopted to improve the condition of the cattle. A mixture of tamarind, <i>jaggery</i> and onions, beaten and mixed</p>	<p>MANAGEMENT. <i>Kacha Gowlies</i>.</p> <p>Occasional abnormal growth when green fodder is abundant.</p> <p>Remedies described.</p>

Mysore. (A. Kristnamangar and H. T. Pease.)

OXEN.

TEETH, HORNS AND AGE.

AGE.

The age of cattle, as usual elsewhere, is ascertained from the condition of the front teeth and their periodical changes. Another indication of age, though less precise, is the appearance and growth of the horns in the earlier years and the number of hollow rings formed on them as the animal grows older.

The calf has, at birth, its two front teeth. In about a month all the eight teeth are up. In the majority of cases where teething is regular, the first formed pair exhibits signs of wearing at one and a half to two years and, falling at about two and a half years, is replaced at three. In a falling pair, one is said to fall off usually a few days or weeks before the other. The second pair of the original teeth, one on each side of the front pair, is similarly replaced from three and a half to four years, the third pair from four and a half to five, and the last pair, to complete eight teeth, is up in level with the others when the animal is six years old, having replaced the last temporary pair at five and a half. This is the usual and what is considered to be the regular course of cutting teeth, the intervals slightly varying in different cases. Cattle teeth show no sign of wearing till after about ten years, when the wearing begins to be appreciable in the first formed set of teeth, gradually extending to the others. All the eight teeth fully wear out at about thirteen or fourteen years, and at sixteen or so the animal becomes incapable of grazing in the pastures, as proper prehension of food by the worn-out teeth becomes difficult. The conclusion as to age from the state of teeth is further invariably verified by the size and appearance of the animal. Between its birth and the fall of its first pair of teeth, the size of the animal and the length of the tuft of hair at the end of the tail are the chief guides, while from full-mouth to the wearing of teeth its appearance and vigour, the gloss of its skin and hairs and its general activity are the only data for estimating the age. When the animal is very old, its pendulous belly, long horns, rough and rather dry muzzle and sparsely growing hairs approximately indicate its age.

Ascertained from front teeth.

As exceptions to the general rule, cases may be mentioned in which the first pair of permanent teeth appears well up as early as two years or at various points of time between two and three. Instances are also known where the interval between the appearance of the first set of teeth and of the second set is much longer than a year, and where the second and third sets instead of following the first in regular succession fall off together and are simultaneously replaced, the last set, however, taking the usual time. In some cases the several sets of teeth get replaced at short intervals from three to six months, so that the animal becomes full-mouthed at four and a half or five years. There are again some cases in which the first set of permanent teeth begin to show symptoms of wearing before the last set is replaced. Such are some of the irregularities in dentition. Teeth formed in regular course of dentition are stronger and last longer than those cut

OXEN.	The Cattle of
SELECTION.	<p>irregularly. Teeth of cattle grazing in stony soils naturally wear out earlier. Irregularity in teething must of course upset calculations of age founded upon regular dentition, the only data for estimating age in those cases being the other conditions already referred to.</p> <p>One ring is formed on the horns when the animal has two permanent teeth, and every subsequent year so that the age of the animal may be roughly determined by inspecting the horns. This is, however, a very unreliable method as the rings are often pared off.</p> <p>SELECTION OF CATTLE FOR DIFFERENT PURPOSES.</p> <p>It may be useful to give here a brief account of the points which are generally understood by raiyats and breeders to indicate special fitness of cattle for the various services required of them. Cattle are to be judged by their capacity or fitness (1) for heavy draught, (2) for fast trotting or walking with a moderate weight to pull, (3) for carrying heavy loads as pack bullocks, (4) for enduring fatigue and heat and exposure to the weather, (5) for milking, (6) for butter producing, (7) for slaughter, (8) for breeding, and (9) for breaking in unruly and untrained animals.</p> <p>The characteristics of animals adapted for slow but heavy draught are—</p> <ol style="list-style-type: none"> (a) Height, length and a big frame. (b) Thick, short and strong neck. (c) Broad chest and loins, with a level back. (d) Well rounded barrel having strong, broad and deeply bent ribs. (e) Short legs, good bone and well-formed but massive shoulders and hind quarters. <p>Cattle of the <i>Mahadeswara betta</i> breed and those castrated after cutting six teeth are generally considered best fitted for heavy slow draught.</p> <p>In animals intended for fast trotting, the mechanical requirements are different and to some extent the very reverse of those fitted for heavy draught :—</p> <ol style="list-style-type: none"> (a) A medium sized but very compactly knit frame. (b) A long and comparatively thin neck and well balanced head. (c) More or less level back and broad loins. (d) A round but compact barrel. (e) Long and thick legs with small fetlocks. (f) Small hump, dewlap and sheath. (g) Thin and tight skin. (h) Narrow flanks.
Points of animals adapted for heavy draught.	
Characteristics of animals intended for fast trotting.	<p>The cattle of the <i>Chitaldroog</i> breed in general and among them those castrated at an early age, i.e., at four teeth and below, are known to</p>

Mysore (A. Kristnamangar and H. T. Pease.)	OXEN.
be very speedy animals. Among other features of fast trotting bullocks may be mentioned short, thin tail, small ears, thin, long horns, thin, soft hair, red eyes, long face, and muscles like whipcord.	SELECTION.
The points of pack animals intended for carrying heavy loads are—	
(a) Bony, compact frame.	
(b) Strong chest and loins, equally and well developed. If these are weak, the animal struggles in ascents and descents.	Rack animals
(c) A level and wide back with strong vertebræ and well-arched ribs.	
(d) Short, straight and stout legs with short pasterns and well-developed shoulders and thighs.	
If the animals are short, it is all the better for loading. Cattle designed for this purpose should not be allowed to breed prior to castration which should be effected at the beginning of the sixth year. Most cattle suitable for this kind of work are found among the " <i>Nadudana</i> ". As these animals have to traverse all kinds of soils and uneven ground, they should be particularly strong in points (b), (c) and (d), and should have besides, strong, hard hoofs, of which the two halves should be equal.	
The points of animals intended for work involving much fatigue and exposure are the same as those of fast trotting bullocks. The smaller and more compact the animals the more capable are they of standing fatigue. A hardy course of treatment in breeding such as the <i>Anrut Mahal</i> and other semi-wild herds undergo, prepares them for any extraordinary call upon their powers of endurance. White-skinned cattle are delicate. They get a staring coat in the cold weather, are easily tired and perspire under work, and cannot stand heat or the inclemencies of the weather. Black-skinned animals, on the contrary, are hardy and can resist the effects of exposure. Cattle of the <i>Halikar</i> breed and many bulls of the " <i>Nadudana</i> ," especially those of ' <i>Linoadahalli</i> , <i>Pavagada</i> , <i>Midigesi</i> , <i>Bettadapur</i> and <i>Metikuppe</i> , are known to be hardy, spirited, and capable of enduring much fatigue.	Animals for work involving fatigue.
The points of a good milking cow are not well understood by the generality of breeders, dairy farming being in a backward state. From observations made, the following peculiarities appear to characterise good milkers:—	Characteristics of a good milker.
(a) The neck is long and thin and carries a comparatively small head.	
(b) The girth at the chest is much less than that at the loins; the greater this difference the greater the milking capacity, but the fall should be gradual.	
(c) The udder is large and has big teats.	
(d) The calibre of the milk veins is large with extensive ramifications forming knots in their course. If these are continued backwards over and beyond the udder into the milk-mirror, it is still better.	

OXEN.	The Cattle of
SELECTION.	(e) The skin is thin, loose and soft, having fine downy hairs, and some times greasy to the touch.
Points of a good milker.	<p>It is asserted by some that the thighs should be thin and stand far apart. There is a difference of opinion on this point. Good milkers often have ugly-shaped and small horns, but this does not appear to be the rule. Cows with a deep, pendulous belly and having small and shrunken udders are bad milkers. Size of the udder is not, however, an unfailing test of a good milker. Indeed the peculiarities generally accepted as indicating good or bad milkers are not an infallible criterion, and the most critical eye often fails in correctly estimating the capacity of the cow. Cows are known to yield more milk when they drop their second, third, and fourth calves, declining gradually from that time in their yield of milk with every successive calf, unlike buffaloes in which milk increases with every successive calf. The yield is comparatively poor at the first calving. Cattle kept in "<i>roppas</i>" in a semi-wild state are generally bad milkers. Mysore cows are on the whole bad milkers, the average yield being from half to one seer each morning and evening. Of the several breeds found in the Province cows of the <i>Mahadeswara betta</i> breed are the best milkers though judged by the standard of the "<i>Gokai</i>" or <i>Nellore</i> cows the quantity is poor and the quality inferior except when special foods are given. An average cow of this breed with good food, yields $1\frac{1}{2}$ seers each time or 3 seers a day, allowing as much for the calf. Cows of other breeds yield richer milk, though the quantity is less. The <i>Amrut Mahal</i> and the kindred <i>Hallikar</i> breed of <i>Karadahalalli</i> are bad milkers. Of dairy produce, <i>ghi</i> is the only valuable article. Milk is in little demand, except in towns. In villages milk is not used as food, and is rarely sold. Butter-milk or curds, from which butter has been extracted, mixed with ragi-ball or rice, is a dish of the people. Milk and curds have value in the neighbourhood of towns. Numbers of people, women mostly, from the surrounding villages may be seen pouring into large towns of a morning to sell their milk, butter, curds, and <i>ghi</i>. Systematic dairy farming on any large scale is as yet unknown.</p>
Yield of butter.	<p>Cows differ much in their yield of butter. Good butter-producing cows have generally compact udders and small teats. The teats are glossy and hard and difficult to milk. This may be due either to the orifice at the tip of the teats being small or to the milk being thick, being impregnated with fatty and solid matter. Milk containing much butyric matter is heavier, sweeter and less frothy. Generally cows whose udder and the milk-mirror are greasy to the touch, produce more butter for a given quantity of milk. <i>Hallikar</i> and village cattle are generally good butter-producers.</p> <p>Animals are not, as a rule, bred purely for slaughter purposes, as the demand for them is confined to towns inhabited by Europeans and Mahamadans. Cattle discarded from other services are generally the only ones sold to butchers.</p>

Ledger.

Mysore. (A. Kristnamangar and H. T. Pease.)	OXEN.
<p>Large-sized, heavy and strong animals, slow by nature, and docile in their habits, are employed for breaking in semi-wild and untamed animals. Cattle of <i>Mahadeswara betta</i> breed are particularly fitted for this work.</p>	<p>AMRUT MAHAL CATTLE.</p>
<p style="text-align: center;">AMRUT MAHAL BREED.</p> <p>Among the breeds found in Mysore the first place is undoubtedly taken by the Amrut Mahal. The following history of the breeds is summarised from Colonel Hay's report and other records. The different breeds composing the present <i>Amrut Mahal</i> cattle owe their origin to the cattle of the tribe of <i>Gollas</i> and their sub-tribe of <i>Halikars</i> who, with their superior cattle, are believed to have migrated in ancient times in several successive waves from the North and settled in different parts now comprised in the Chitaldroog and Tumkur Districts.</p> <p>The "<i>Karuhatti</i>" establishment of the Vijayanagar Viceroy (some time between 1572 and 1600) at Seringapatam consisted of <i>Halikar</i> cows imported from Vijayanagar. This may be said to have been the nucleus of the <i>Amrut Mahal</i> cattle. The Seringapatam cattle passed into the hands of Wadayars of Mysore, some of whom, notably Chamaraj Wadayar (1617—1636), Kantirava Narasaraj Wadayar (1638—1658), and the celebrated Chikka Devaraj Wadayar (1672—1704) made their own additions to them from time to time, assigning "<i>kavals</i>" in different parts of the Kingdom. It was in Chikka Devaraj Wadayar's time that the cattle establishment obtained recognition as one of the departments of the Administration. It was called "<i>Benne chavadi</i>" or establishment of cows both as a breeding stud and to furnish milk and butter for the Palace. He introduced for the first time the system of branding them with his initial. The accumulated herds of the Rajas of Mysore passed on to Hyder Ali when he usurped the throne. In extending his conquest and in reducing the numerous rulers who had held sway over more or less extensive tracts in Mysore, he acquired also the herds of superior cattle belonging to them. Among these may be mentioned the Pallegars of Chitaldroog, Tarikere and the Raja of Nagar. Hyder seems to have made extensive use of the cattle which he had appropriated in the movements of his army equipage, and is popularly credited with having kept at least 60,000 bullocks in different parts of the Province, though they were not organised as carefully and in as minute details as was afterwards done by Tippu, on a system which has in essential points been adhered to ever since. Upon succeeding to the throne of his father, Tippu added to these herds those of the Pallegar of Hagalvadi. Chikka Devaraj Wadayar's suggestive name of "<i>Benne chavadi</i>" was changed in his time into a more pompous one of <i>Amrut Mahal</i> from <i>Amruta</i>=Nectar. Tippu took great interest and issued a "<i>Hukumnama</i>," or regulations for the Department, the greater part of which continued to be observed after the taking of Seringapatam, and the same system was afterwards followed by the British officers. The</p>	

History of the Breed.

OXEN.	The Cattle of
AMRUT MAHAL CATTLE.	<p>Dairy Department seems to have been on a large scale and amildars were expected to train the young steers which were allowed to graze in the raiyats' fields and were classified when required as gun bullocks, pack bullocks, and plough bullocks, etc. There was an annual muster of the herds, and Tippu frequently attended it in person and distributed rewards. Such was the composition of the <i>Amrut Mahal</i> cattle inaugurated by Chikka Devaraj Wadayar, reconstituted by Hyder Ali and thoroughly organised by Tippu Sultan.</p> <p>The attention of the British was first called to the excellence of the breed when it enabled Hyder Ali to march 100 miles in two days and a half to the relief of Chellumbrum, and after every defeat, to draw off his guns in the face of his enemies; and when Tippu Sultan was enabled to cross the Peninsula in one month for the recovery of Bednore and to march 63 miles in two days before General Meadows. It also enabled the Duke of Wellington to execute those marches of unexampled rapidity which are the admiration of military men, and the Duke brought it prominently to the notice of the then Commander-in-Chief Lieutenant-General Stuart. Other memorable military events might also be cited to the credit of these cattle. It is said that during the Peninsular War the Duke often regretted that he had not the services of the cattle of this breed. On the fall of Seringapatam the whole of the cattle became the property of the British Government, the management of the herds being allowed to remain with the Maharaja of Mysore, on the condition of his supplying a certain number of bullocks. It was probably imagined that the same attention would be given to the establishment as had been extended to it by the former Government; but Tippu Sultan had depended on it for the efficiency of his army, and the new Government could be actuated by no such motive. The consequence was that the establishment was left to the servants who had charge of it, and by them neglected and abused; the British Government were disappointed in their expected supplies, and the cattle were allowed to degenerate to such a degree that after a period of thirteen years it became necessary to resume charge of it in order to preserve the breed from extinction. In 1813 the <i>Amrut Mahal</i> cattle, together with the pasture lands, were handed over to Captain Harvey of the Madras Commissariat. The herds then rapidly improved and doubled in number in the course of but ten years. In 1840 the Maharaja's herds and grazings were amalgamated with those of the British Government and the whole placed under the officers of the Mysore Commission. In 1860, from motives of economy, Sir Charles Trevelyan ordered the establishment to be broken up and the herds to be sold; this appears to have been a fatal error alike in policy and economy, and the results were detrimental to the public service. The price of cattle soon became prohibitive (Rs 150 each), and it was, with the cordial approval and assistance of the late Maharaja, re-established in 1866 by the purchase of such cows and bulls of the old</p>

Ledger.

Mysore. (A. Kristnamangar and H. T. Pease.)	OXEN.
<p>breed as were procurable in the Mysore Country; very few were obtained owing to the Pasha of Egypt having secured most of the best blood; fortunately, however, the late Maharaja was a large purchaser when the old establishment was broken up, and the Madras Government was able to obtain sufficient stock to fairly start again in 1870, the complement being 4,000 cows and 100 bulls.</p>	<p>AMRUT MAHAL CATTLE.</p>
<p>In 1883 the British Government handed over this valuable property to the Government of His Highness the Maharaja for Rs.25,000. It is now entirely under its control, and every effort is made by careful elimination of doubtful stock to restore the old breed. Stud books have been opened, and the cattle are mustered annually by name and brand. Births and deaths are registered and reported in monthly returns, and frauds on the part of subordinates have been to a great extent prevented. The Madras Government receive from the establishment 200 bullocks annually.</p>	
<p>The cattle of this breed originally comprised three distinct varieties: (1) Hallikar, (2) Hagalvadi, and (3) Chitaldroog. Prior to the abolition of the Department in 1860, the several herds seized by Hyder and Tipu seem to have been maintained for the most part unmixed as separate "<i>Servés</i>," the distinguishing peculiarity of each breed being thus kept unadulterated. In 1866, when the Department had to be organised afresh by re-purchasing the stock, it was found impracticable to get back in their original purity all the cattle sold six years before. At this juncture the men to whom the work of fetching the cows was entrusted on promise of appointing them "<i>Servégars</i>," freely mixed the three main varieties of the old Amrut Mahal, besides introducing a large number of inferior cows of every other breed including their own bred cattle known as "<i>Swanto gosw</i>." A very great number of <i>Mahadeswara betta</i> cows are also said to have been passed off for the reconstitution of the Department. During recent reductions and reconstitution of "<i>Servés</i>" since 1877 many herds have been broken up and distributed among others, new herds have been formed out of the excess stock of the old ones, and exchanges of stock are often being made between different "<i>Servés</i>," all tending to promote mixture. The present <i>Amrut Mahal</i> cannot therefore be said to be as pure as it was prior to 1860, although careful selection and uniformity of treatment in recent years seem to have erased a good many points of difference which must have necessarily existed at the time of reconstitution of the herds in 1866. The different breeds, <i>Hallikar</i>, <i>Hogalvadi</i> and <i>Chitaldroog</i>, vary but slightly, their general character being the same. The <i>Hallikar</i> is considered to be the best. The distinguishing features may be gathered from the following description:—</p>	<p>Originally included three varieties.</p>
<p>"The head is well shaped, long and tapering towards the muzzle which is generally black; the forehead bulges out slightly and is narrow and furrowed in the middle. The horns are unique in shape and differ considerably from most other breeds. They are usually large, set well back on the crest of the frontal bones springing close together, they diverge inclining backwards each in a straight line for</p>	<p>Chief points.</p>

OXEN.	The Cattle of
AMRUT MAHAL CATTLE.	<p>nearly half their length and then with a gentle and graceful sweep bend forward usually slightly, inclining inwards towards their points, which are black tipped and exceedingly sharp. At times when the head is down, as when feeding, the horns touch or almost touch the neck in front of the hump. They thicken gradually as the head is approached and are very strong near the base which seems to extend, apparently to give strength, down the forehead between the eyes as a distinct ridge on each side, thus forming a perpendicular groove or depression in the centre of the forehead." (Wallace.)</p>
Chief points.	<p>In large herds, there is a remarkable similarity of horns. The bulls and cows in herds show a tendency, at the sight of strangers or apprehended danger, to close together presenting their horns, which resemble the bristling bayonets of a regiment of infantry drawn up in deep square to the enemy, and thus in serried ranks they have been known to charge a horseman and bowl him over horse and all.</p> <p>The eyes are not large, but are quick and intelligent and in some cases blood-shot, and below the eyes in some specimens of the <i>Hallikar</i> breed there is a yellow spot.</p> <p>The ears are small and taper to a point, being carried in a horizontal position; they are yellow inside.</p> <p>The neck is long, thin for the size of the cattle, and sinewy.</p> <p>The dewlap is thin and does not extend very far back.</p> <p>The hump is well developed in the bull rising to a height of eight inches.</p> <p>The shoulders are singularly neat and well formed.</p> <p>The back is strong, broad and straight.</p> <p>The barrel and ribs are well rounded and deep.</p> <p>The loins are wide and strong, though the fall of the croup is usually rapid but in a few instances more gradual.</p> <p>The tail is thin and tapers, terminating in a tuft of black hair which is generally scanty.</p> <p>The legs are clean, strong and sinewy, standing well apart. The hoofs are small, well formed, black and hard, with a very close cleft between.</p> <p>The skin is thin and jet black with short and glossy hair.</p> <p>Broken colors being carefully weeded out and sold, these cattle are of a uniform color, varying from a light to a deep iron-grey with a darker shade over the shoulders and hind quarters.</p> <p>They seldom attain a very large size.</p> <p>In shape they are remarkably neat with muscles like whipcord.</p> <p>The difference between cows and bulls in size and build is not so very well marked in this as in other breeds. The cows have a masculine look only with smaller hump and finer horns. In color they are invariably of a lighter grey.</p> <p>These being the general features of the three great varieties composing the <i>Amrut Mahal</i>, some special characteristics developed by local peculiarities in the different herds may here be noticed. The cattle found in</p>

Mysore. (A. Kristnamangar and H. T. Pease.)	OXEN.
<p>the "<i>kavals</i>" of the Mysore District are of much larger size than those found in the north. They have better bone, carry thicker and rather less gracefully set horns, and have a thicker tail; their hoofs are said to be not so hard as those of cattle in Chitaldroog, from which they also differ in having a somewhat pendulous sheath and dewlap. The cattle in the Tumkur, Hassan and Kadur Districts, though slightly smaller in size, are very much like those in Mysore. The herds of the eastern parts of the Chitaldroog District consist of cattle of smaller size but of more compact and hardy frame with a finer tail, thinner and more gracefully set horns and harder hoofs. The cattle of the western Chitaldroog and Channagiri Taluks resemble the last named variety differing from them only in being slightly bigger in size.</p>	AMRUT MAHAL CATTLE.
<p>Heifers in the Mysore District generally calve in the sixth year and are "<i>Mukhandies</i>". In the Hassan, Tumkur and Kadur Districts they reproduce for the first time in the fifth year and are generally "<i>Ikhandies</i>." Those in the Chitaldroog District and in the Channagiri Taluk are regular "<i>Varshakandies</i>" and commence calving in the fourth year. Twenty cows are allowed to one bull. The bulls are not used until they are five years old, and retain their vigour until they are ten, after which they are castrated and discarded from the herd. The cows, though generally in good condition, do not get in season while in their Malnad "<i>kavals</i>" owing to exposure to rain and wet. When they are turned to their "<i>Maidan Kavals</i>" they breed in great numbers. The most favorable time for breeding, as is the case with other cattle, is when pasture and water are abundant, and the most favorable months for births are January and February, and August to December. The calves remain with their mothers during the day, but are separated from them at night and are sheltered in folds. When they are three months old they are able to graze and commence to subsist on pasture. In the cold season when the herbage is abundant, they are generally weaned when about five months old; such as are born later in the year cannot be separated from their mothers until after the hot weather. After separation care is taken to conduct them to the richest pastures in the neighbourhood, but they are supplied with no food beyond what they can graze on pasture. Calves are castrated when they are eighteen months old, in the cold season. Early castration is the rule in this Department.</p>	
<p>The cattle are kept in their grazing grounds, called "<i>kavals</i>," about 210 in number, distributed over the greater portion of the Western and Central Mysore, and covering an immense extent of country. They comprise varieties of soils often undulating and covered with scrub jungle growth. The cattle feed on various grasses, though "<i>Vunaga</i>" (<i>heteropogon contortus</i>) is by far the most predominant. In "<i>kavals</i>" in valleys generally the grazing is most nutritious. As the country becomes more elevated, the grass is more scanty and inferior in quality. These "<i>kavals</i>" are divided into (1) hot weather, (2) wet weather, and (3) cold weather "<i>kavals</i>," according to the season of the year at which</p>	Seasons for breeding.
	Pasture lands.

OXEN.	The Cattle of
AMRUT MAHAL CATTLE.	<p>they are most suitable for grazing. The hot weather "<i>kavals</i>" are generally the beds of tanks in which grass springs up during the hot months and where generally there are trees capable of affording shade to the cattle during the heat of the day. The cold and wet weather "<i>kavals</i>" are those where the grass dries up during the hot weather. The cattle are driven for about four months in each year from about May to September to their Malnad "<i>kavals</i>." The herds in the south are taken to the south-western jungles on the Coorg frontier and those in the north to the Lakkavalli and Channagiri Forest "<i>kavals</i>" in the Kadur and Shimoga Districts, where the first showers of the advancing Monsoon ensure an early and abundant growth of grass. They then return to their Maidan "<i>kavals</i>" about the beginning of September in each year, when the supply of grass is very plentiful all over Mysore. The whole of the cattle are divided into "<i>Servés</i>" or herds, each of which with the attendants attached to it is kept separate and distinct. The establishment of each herd is fixed at two hundred breeding cows, one hundred heifers, twelve bulls, and twenty "<i>Peshros</i>" or leaders, with the calves of both sexes and of all ages, the actual produce of the herd, the number of which, of course, varies according to circumstances, but which, generally speaking, raises the total number of animals in each herd to five to six hundred head.</p>
Size of herds.	<p>Each "<i>Servé</i>" or herd is placed in charge of a "<i>Servégar</i>" assisted by two "<i>Mundals</i>," each of whom is responsible for the proper management of the cattle under his charge. An establishment of graziers and other attendants is likewise attached to the herd. The number of "<i>kavals</i>" attached to each herd varies from three to nine according to the size of "<i>kavals</i>" and the quantity of pasturage they afford, and although the herds are not supposed to be permanently attached to particular "<i>kavals</i>," still they are not removed from those which have for any time been allotted to them without special reasons. The whole of the herds are divided into fourteen "<i>Tukries</i>" or divisions, some composed of two and others of three herds, the "<i>kavals</i>" belonging to each "<i>Tukry</i>" being, of course, conveniently situated. Each "<i>Tukry</i>" is placed under the superintendence of a "<i>Daroga</i>," whose duty it is to frequently inspect the herds, to muster the cattle, and to check and report all irregularities on the part of the attendants in charge of them, and also to accommodate, as far as may lie in his power, any difference which may arise with the inhabitants or local authorities. At the annual inspection of the cattle which takes place in the vicinity of the grazing farm in the months of July and August, each herd is separated and carefully examined, all inferior cattle removed and unmarked cattle branded.</p> <p>The bullocks are separated from the herds after four years of age; and the bulls sold to the Madras Government are transferred to the Public Cattle Department at Hunsur, when turned five, to be perfectly trained for work. They are in their full vigour at seven years and are past it at</p>

Mysore. (A. Kristnamangar and H. T. Pease.)	OXEN.
<p>twelve years; they work until they are fourteen or fifteen years, after which they rapidly decline and die at about eighteen years of age.</p> <p>The cattle of these herds are kept in a semi-wild state. They are kept in the open, and all the protection or shelter they are afforded is that of trees, from the midday sun and rain. They roam about in unrestrained freedom in their vast "<i>kawals</i>," to the great benefit of their health and limb. This mode of treatment and rearing in a state of nature kills weaklings and produces a hardy stock barely possible in purely artificial breeding. When contagious diseases break out, the herds can be divided and the sick sent to a separate pasture. Indeed the cattle being hardy by nature and segregated from village cattle, contagious diseases make their appearance but rarely among them.</p>	<p>AMRUT MAHAL CATTLE.</p> <p>Mode of rearing adopted produces hardy stock.</p>
<p>In disposition the cattle are wild, unruly, and impatient of the presence of strangers; it requires several months of kind treatment and patience to break them in. For days together they are kept on starvation allowance of fodder, and when they are weak and subdued they are gently handled by the keeper to whom they by degrees get accustomed. They require to be gradually habituated to the yoke, and harsh treatment makes them stubborn. In 1818 the Commissioner of Mysore said of them: "They are active, fiery, and walk faster than the troops; in a word, they seem to constitute a distinct species, and to possess the same superiority over other bullocks in every valuable quality that Arabs do over other horses." Professor Wallace remarks in 1889: "The breed as a whole occupies amongst cattle a position for form, temper, and endurance strongly analogous to that of the thoroughbred horse amongst horses." The bulls are highly valued both for breeding and for draught. Their speed, spirit and endurance place them high in usefulness for military transport. The concurrent testimony of all high authorities point to the desirability of developing the Training Depot at Hunsur and of the Indian Transport Department employing <i>Amrut Mahal</i> cattle more extensively than now.</p>	<p>Disposition.</p>
<p>As dairy stock, the cows are indifferent being poor milkers. The whole of the milk, being scarcely sufficient, is left to nourish the calves, other use of it being strictly forbidden. Good cows yield about one seer each time, allowing as much for the calf. The milk is sweet and rich. The price paid for them by the Madras Government is Rs 50 per head. Average prices may be stated to be as follows:—</p>	<p>Not suitable for dairy purposes.</p>
<p>Very good (breeding) bulls Rs 80 to Rs 130. Average bulls Rs 50 to Rs 65. Very good cows Rs 60 to Rs 90. Average cows Rs 40 to Rs 60. A pair of first class bulls is said to fetch in Hyderabad so much as Rs 500 to Rs 800. People in the Dharwar Collectorate eagerly seek these cattle and pay heavy prices for uncastrated bulls of two to four years of age, Rs 100 to Rs 150, according to quality. It is said that a pair of bullocks was sold there for Rs 800, having won a race in dragging a heavily laden cart through sandy soil.</p>	<p>Prices realised.</p>

OXEN.	The Cattle of
HALLIKAR CATTLE.	<p data-bbox="507 386 630 410" style="text-align: center;">ALLIED BREED.</p> <p data-bbox="305 418 865 573"><i>Gosu or Swanta Gosu Cattle.</i>—<i>Gosu</i> is a mixed breed of cattle, being a cross originally between select cows of "<i>Nadudana</i>" and pure <i>Amrut Mahal</i> bulls. The herds form the property of the "<i>Servigars</i>" of the <i>Amrut Mahal</i> Department who are allowed the privilege of keeping their cattle with Government herds. Having been long associated with the <i>Amrut Mahal</i> breed, <i>Gosu</i> cattle are little different from, or inferior to, them.</p> <p data-bbox="479 589 664 613" style="text-align: center;">HALLIKAR BREED.</p> <p data-bbox="305 621 865 727">The history of this breed has already been given under the head of the <i>Amrut Mahal</i> cattle, of which the <i>Hallikar</i> breed is the most important and valuable member. It need only be added here that while the name of <i>Gollas</i> has disappeared among cattle, that of <i>Hallikars</i>, their sub-tribe, has survived in the cattle which they introduced into Mysore.</p> <p data-bbox="305 735 865 946"><i>Hallikar</i> cattle are found, besides the Government <i>Amrut Mahal</i> herds in the Tumkur, Hassan, and Mysore Districts, the chief centres being parts of the Nagamangala, Kunigal, and Gubbi Taluks. The area over which the breed prevails is not by any means extensive, and it is thinly scattered even within those limits. The reason is obvious. There are no extensive pastures in the habitat of these cattle, and the tracts being populous they are mostly home-fed and are not maintained in great numbers except by a few breeders in the Nagamangala, Gubbi, and Kunigal Taluks. They are bred in small numbers by the agricultural classes in many villages.</p> <p data-bbox="305 954 865 1060">The features of this breed have been fully described under the <i>Amrut Mahal</i> cattle and need not be repeated. They are strongly characteristic and make the contrast between this breed and the <i>Mahadaswara betta</i> cattle patent and striking. Such slight differences as exist between it and the allied <i>Chitaldroog</i> breed will be stated further on.</p> <p data-bbox="305 1068 865 1344">Special attention is given to the matter of selection in breeding. Cows are never allowed to be served by inferior bulls, though no restriction is enforced as to the age of cows fit for breeding. Heifers at 2½ years are allowed to breed if they happen to be in season. Special breeding bulls of this breed are maintained by private owners to be hired out for service. The cows are rarely milked, and even when they are, very little milk is drawn and only in the mornings, the calves being allowed to go with the mothers. Calves are weaned when they are three or four months old if there is a demand for them. Cows are driven out to graze during the day and are housed and fed at night except in those few instances in which they are kept in "<i>roppas</i>." Late castration is the rule, though sometimes bulls are castrated early. The following measurements are given for reference :—</p> <p data-bbox="305 1352 428 1377" style="text-align: center;">O. 551—94.</p>

Where met with.

Care practised in breeding.

Mysore. (A. Kristnamangar and H. T. Pease.)																OXEN.		
																HALLIKAR CATTLE.		
																Measurements.		
Sex.	Age.	Height at shoulder.	Height at croup.	Height at elbow.	Length from poll to buttock.	Length of horn.	Length of ear.	Length of face.	Breadth of forehead.	Girth at chest.	Girth at abdomen.	Girth of forearm.	Girth of shank.	Length of neck.	Length of shank.	Color of skin.	Color of hair.	REMARKS.
Bull	4.	55	55½	..	79	9½	9½	21	8	76	79	13	7½	19	9½	Black.	Slate.	
Bull	10	53	54	..	77	17	9	20	8	70	72	13	7	17	9½	Do.	Do.	
Bull	5	56	57	..	80	15½	11	22	8	81	74	13½	8	17	9½	Do.	Do.	
Cow	10	47	51	..	67½	17	8½	18	8	60	67	0	6	16	9½	Do.	Green.	

Measurements.

OXEN.	The Cattle of
HALLIKAR CATTLE.	<p>Cows are generally grey in color; they have small and compact udders with small and hard teats. They are poor milkers, though the milk is rich and sweet with a high percentage of butyracious matter. The cattle are of high mettle, and though mostly home-bred, are not gentle or tractable. There is always a great demand for these cattle, and as the number annually produced is not sufficient to meet it, high prices prevail. The average market value is:—Very good (breeding) bulls R80 to R120. Average bulls R50 to R75. Very good cows R60 to R100. Average cows R40 to R60. Bull-calves of one year R20 to R40.</p>
Prices.	
Noteworthy example of the breed.	<p>One remarkable specimen of the breed deserves special mention. This is found at Karadahalli in the Nagamangala Taluk. <i>Gujmavu</i>, the most valuable variety of the <i>Hallikar</i> breed, commands very high prices. Tradition ascribes its origin to a cow crossed by a buck. One peculiar point in these cattle is their great length, and which gives them a greater mechanical advantage and strength. The state of nature under which the <i>Amrut Mahal</i> cattle grow is imitated in some degree by the Karadahalli breeders who send their herds to distant jungles in the Heggaddevankote Taluk for the benefit of the early season pasture. Hence is seen among the <i>Karadahalli</i> breed the same uniform shape, color and horns. Superior bulls are kept at Karadahalli for breeding purposes. Cows even from distant places are taken to these bulls for service upon payment of a fee of R1 to R4 for each service. The raiyats of the neighbouring Taluks of Mandya, Seringapatam and Closepet advance to the breeders of Karadahalli R50 to R100 for calves still in the mother's womb. If a cow-calf is dropped the advance is returned, as it is not customary for the Karadahalli breeders to sell cows of their breed. If a bull-calf is brought forth it is sold according to the original agreement. In some cases such sales are subject to the provision that the calf should be reared for two years and resold to the original owner for its full value at the time of its resale, which generally is R100 to R200. This system of selling and reselling obtains as it affords a convenient division of labor.</p>
Description of Karadahalli (<i>Gujmavu</i>) Breed.	<p>A breeding bull of Karadahalli of <i>Gujmavu</i> variety is not inferior in points of excellence to any <i>Amrut Mahal</i> bull. The same well-formed head, gracefully tapering towards the muzzle, the same prominent forehead, intelligent and quick eyes, small ears, and elegantly shaped horns characterise this bull. His powerful shoulders, strong, muscular legs, flinty hoofs, broad chest, deep ribbed and rounded barrel, and by no means ill-proportioned hind quarters, give an idea at once of strength, endurance and speed. In color he is somewhat motley, with patches of pure grey on dark grey ground. The bulls do not attain any large size, the average height being 49 inches. The bulls are castrated in their 5th year and are of good size, compact frame and powerful muscles. The regular breeders of Karadahalli are aware of the importance of preventing immature, inferior and deformed bulls from breeding, and accordingly castrate them betimes. The bulls are somewhat diffi-</p>

Mysore. (A. Krishnamangar and H. T. Pesse.)	OXEN.
<p>cult to tame at first, but when once tamed they are far more tractable than <i>Amrut Mahal</i> cattle, which to the last retain more or less their impatience of strangers. Good <i>Gujmaru</i> cows of this locality are little different from <i>Amrut Mahal</i> cows. The shape of the head, face and muzzle, the eyes, ears, horns, neck, legs and barrel are exactly of the same type. The similarity extends even to the masculine look of the cow. Cows are seldom sold to strangers. They are very highly priced, and though their appearance is not generally such as to give an idea of the value, raiyats and breeders seem to know and appreciate their virtue which is said to consist in producing calves, precisely and without divergence, like the covering bull, whatever its breed or quality. Particular notice has been taken of this variety, not only because it is a creditable instance of successful private enterprise, a more efficient and appropriate agency than a Government establishment in carrying out an industrial undertaking like cattle-breeding, but likewise in the hope that it may be the means of inducing owners of good cows to send them to be covered by the bulls. At present the breed is confined to a limited locality and to a restricted number of breeders, and though this has its advantages in securing purity and uniformity in the hands of experts in good cattle-breeding, still even other types of cattle might be considerably improved by crossing with the bulls.</p>	<p>HALLIKAR CATTLE.</p> <p>Karadahal (Gujmaru) Cows.</p>
ALLIED CATTLE.	
<p><i>Hagalvadi Breed.</i>—This seems to have been, at one time, a valuable breed; large herds belonging to the Pallegar of Hagalvadi (now in the Gubbi Taluk of the Tumkur District) were appropriated by Tippu when he took Hagalvadi. The breed has no existence now as distinct from <i>Hallikar</i> and are hardly distinguishable from them.</p>	Allied Breed
<p><i>Bettadapur Breed.</i>—This is a mixed breed—a cross between country or "<i>Nadu</i>" cows and pure <i>Hallikar</i> bulls, tracing its origin to the times when the Mysore Wadiyars had their cattle in the "<i>Kavals</i>" of Bettadapur and its neighbourhood. The breed is thinly distributed in the Taluks of Krishnarajpet, Yedatoré, Hunsur, Hollé-Narsipur, Arkalgud and Hassan. Its chief breeding centre is now a group of <i>Hallikar</i> villages, Ichur and others, situated to the west and south-west of Bettadapur, in the Hunsur Taluk. This breed is inferior to the <i>Hallikar</i> in color, symmetry of form and shape of horns which are irregular and thick. It has, however, the same spirit and powers of endurance and is in great demand all over the west of Mysore and in Coorg. Great numbers are sold at the annual "<i>Yatra</i>" of Chunchankatté. The breed has degenerated of late years owing to the scarcity of good bulls and to bad management, many small cattle being now mixed with it.</p>	
CHITALDROOG BREED.	
The <i>Chitaldroog</i> breed owes its origin to the cattle of the ancient	
O. 551—94.	

OXEN.	The Cattle of
CHITAL- DROOG CATTLE.	<p><i>Gollas</i> who settled in that District. The Pallegars of Chitaldroog formed their own herds from the flower of the <i>Gall</i> cattle, and these upon Hyder's conquest were united with his cattle establishment. In the auction sales of the <i>Amrut Mahal</i> cattle upon the dissolution of that Department in 1860, the largest purchases were made in the Chitaldroog District and one or two taluks of the neighbouring District of Shimoga. During recent years, again, the surplus stock of this Department have been frequently sold. These circumstances have had the effect of throwing into that region a great number of cows of the <i>Amrut Mahal</i> breed which are found to predominate not only in herds but also in villages. Cattle of this breed are found all over the Chitaldroog District and in adjoining parts of the neighbouring District. The chief breeding centres are the Taluks of Challakeré, Hiriya, Chitaldroog, Holalkéré, and Channagiri.</p>
Points of difference from <i>Hallikar</i> Breed.	<p>The breed bears a close resemblance to the <i>Hallikar</i>, differing from it only in some minor points, <i>vis.</i>, the head is smaller and shorter but not stumpy like that of the <i>Mahadeswara betta</i> cattle. The forehead resembles that of the <i>Hallikar</i>, though owing to the shortness of the head it does not appear to be so narrow, and the furrow is absent. The horns are thinner, longer and taper more gradually; but as they grow upwards they separate more from each other and bend forward with a deeper curve. The neck, tail and dewlap are thinner. In color, the breed is inferior, white being predominant; in size they are smaller only slightly in the western but in a greater degree in the eastern, parts of its habitat, <i>i.e.</i>, Chitaldroog and Challakeré.</p>
Breeding.	<p>These cattle are kept in "<i>roppas</i>" as well as in villages, and are bred and treated in the same manner as the <i>Mahadeswara betta</i> cattle. Cows come to early maturity, taking the bull usually in the 4th year. When fresh grass springs up with the early rains, all the large herds are driven to salt lands and are allowed to lick earth-salt which operates as a purgative and tends to improve their condition when grazing in fresh pastures.</p>
More numer- ous than <i>Hallikar</i> Cattle.	<p>In temper they are not different, but being smaller and as compact they are exceedingly active and quick-footed.</p>
Prices.	<p>As dairy animals they are not superior. Bullocks of this breed are chiefly used for cart draught. The breed is much larger numerically than <i>Hallikar</i>, and the supply is considerable. Great numbers are annually purchased by the raiyats of the neighbouring Districts of the Bombay Presidency. The average market value is as follows:—First quality bull $\text{R}70$ to $\text{R}100$, superior cow $\text{R}30$ to $\text{R}70$, average bull, $\text{R}40$ to $\text{R}70$, average cow, $\text{R}30$ to $\text{R}50$. The following measurements are given for reference:—</p>

Ledger.

Mysore. (A. Kristnamangar and H. T. Pease.)

OXEN.

CHITAL-
DROOG
CATTLE

Measure-
ments.

Measurements, etc., of the Chitaldroog Breed of Cattle.

Sex.	Age.	Height at shoulder.	Height at croup.	Height at elbow.	Length.	Length of horn.	Length of ear.	Length of face.	Breadth of forehead.	Girth at chest.	Girth at abdomen.	Girth of forearm.	Girth of shank.	Length of neck.	Length of shank.	Color of skin.	Color of hair.	REMARKS.
Bull	5	53	56	...	74½	17	10	20	8	72	72	13	7½	20	9½	Black.	Slate.	
Bull	6	52	53	...	80	15	10	21	8	77	80	15	8	19	9	Do.	Do.	
Bull	5	52	53	...	79	11	9½	20	7	69	72	13	6½	16	7½	Do.	Do.	
Cow	9	45	46	...	68	10	9½	16	7	58	62	9½	5½	17	8½	Do.	Grey.	

Measurements, etc., of the Chittaldroog Breed of Cattle.

OXEN.	The Cattle of
CHITAL- BROOD CATTLE.	ALLIED CATTLE.
Allied Breeds. Account by Buchanan.	<p>With regard to the Chitaldroog and allied breeds, the following remarks by Buchanan at the commencement of the century may not be out of place, as they show pretty clearly the material there was to work upon in the Chitaldroog tract.</p> <p><i>Midighesi.</i>—The country around Midighesi is full of little hills, and overgrown with copse-wood. The villages of the "<i>Gollas</i>" or cow-keepers are scattered about in the woods and surrounded by a little cultivation of dry field. Want of water is everywhere severely felt.</p> <p>Every town and village in this hilly country has herds of breeding cattle. The cattle are fierce; without the protection of the keepers it would be unsafe to approach them.</p> <p>In this country the <i>Kadu Gollas</i> or <i>Gollaru</i> are those who breed cattle. Their families live in small villages near the skirts of the woods, where they cultivate a little ground and keep some of their cattle, selling in the towns the produce of the dairy. Their families are very numerous, seven or eight young men in each being common. Two or three of these attend the herds in the woods, whilst the remainder cultivate their fields and supply firewood and straw for thatch to towns. Some of them also hire themselves to farmers as servants. They wear nothing but a blanket and generally sleep amongst the cattle.</p> <p>The race of oxen in this country may be readily distinguished from those of Bengal by the position of the horns, which in Bengal project forwards and form a considerable angle with the forehead, whereas in those of the south the horns are placed nearly in the same line with those of the <i>Os. fronti</i>. In this breed also the prepuce is always remarkably large and vestiges of the organ are also found in the female. Of this southern breed there are several breeds of very different qualities. Above the Ghâts, however, two breeds are most prevalent. The one is a small, gentle, brown or black animal; the cows are kept in the villages for giving milk, and the oxen are those chiefly employed in the plough; their short, thick make enabling them to labor easily in the small rice plots which are often but a few yards in length. This breed seems to owe its degeneracy to a want of proper bulls. As each person in the village keeps only two or three cows for supplying his own family with milk, it is not an object with any one to keep a proper bull; and as the males are not emasculated until three years old, and are not kept separate from the cows, these are impregnated without any attention to improvement or even to prevent degeneracy. Wealthy farmers, however, who are anxious to improve their stock send some cows to be kept in the folds of the large kind, and to breed from good bulls. The cows sprung from these always remain in the fold, and in the third generation lose all marks of their parents' degeneracy. The males are brought home for labor and in every village may be perceived all kinds of intermediate mongrels between the two breeds.</p> <p>O. 551—94.</p>

Mysore. (A. Krishnamangar and H. T. Pease.)	OXEN.
<p>In the morning the village cows are milked, and are then collected together with all the buffaloes and oxen that are not employed in labor. About 8 or 9 in the morning the herdsmen drive them to pasture. If the herd exceeds one hundred and thirty, two herdsmen must be kept, and their herds go in different directions. The pastures are such waste lands as are not more than two miles distant from the village, and are in general poor; the tufts of grass are but thinly scattered, and bare soil occupies the greater space. The grass, however, seems to be of a very nourishing quality, and the most common species is the <i>Andropogon Martini</i> of Roxburgh.* At noon and at 4 o'clock the cattle are driven to water. At sunset they return to the village; and in the rainy season the cow-house is smoked to keep away the flies. In the backyard of every house stands a large earthen pot in which the water used for boiling the grain of the family is collected; and to this are added the remains of curdled milk, a little flour, oil-cake, or cotton seed. This water becomes very sour, and is given as a drink to the cows in the evening, when they are again milked. At night, in the rainy season, the cattle get cut grass, which is collected in the woods and about the roadsides, the latter being the most nutritious, the very succulent roots being cut up with the leaves and the situation preventing the harsh stems from growing. In dry weather the cattle at night have straw. Those who can afford it give their milch cows cotton seed and "avaray." After the milk for the family has been taken, the calves are allowed to suck, and unless the calves are present during the milking, the cows withhold their milk. The cows breed at three years of age once a year, and milk for six months only. A good cow of the village breed gives about three seers of milk a day. The cattle of the other breed are very fierce with strangers, and nobody can approach the herd with safety unless surrounded by "Gollas," with whom they are very tractable, and the whole herd follow like dogs the man who conducts it to pasture. The cattle of this breed never enter a house, but at night are shut up in folds which are strongly fortified with thorns to defend the cattle from tigers. At five years old the oxen are sold and continue to labor for twelve years. Being very long in the body and capable of travelling far on little nourishment, the merchants purchase all the best for carriage. To break one of them it requires three months' labor, and many of them continue always very unruly. The bulls and cows are so restless that, even with the assistance of <i>Gollas</i>, I could not get them measured, but the dimensions of a medium-sized ox were as follows:—From nose to root of horn, 21 inches; from root of horn to top of hump, 30 inches; from top of hump to projecting part of ischium, 45 inches; hump to ground, 46 inches; croup to ground, 51 inches.</p> <p>The cows of this breed are pure white, but the bulls have generally an admixture of black on the neck and quarters.</p> <p>These cattle are entirely managed by <i>Gollas</i>, and some of these people</p>	<p>CHITAL- DROOG CATTLE.</p> <p>Allied Breeds.</p>

* *Andropogon Schœnanthus*.

OXEN.	The Cattle of
CHITAL- DROOG CATTLE.	<p>have considerable property of this kind; but the greater part of these breeding flocks belong to the rich inhabitants of towns or villages, who hire the <i>Gollas</i> to take care of them; and for the advantage of better bulls send to the fold all their spare cows of the village breed. In procuring bulls of a good kind some expense is incurred, for the price given for them is from £3-7-1 to £6-14-2; care is taken to emasculate all young males not intended for breeding, before they can injure the flock.</p>
Allied Breeds	<p>The <i>Gollas</i> live in huts near the small villages, in parts of the country which contain no uncultivated land, and are surrounded by the folds, in which they always keep as many cattle as will cultivate a little land, and as the pasture near the place will maintain. But as local failures of rain often occasion a want of forage near the huts, some of the men drive their flocks to other places where the season has been more favourable, and either take up their abode near the huts of some other <i>Gollas</i>, giving them the dung of their fold for the trouble they occasion, or live in the midst of the woods in places where small reservoirs, called <i>kattes</i>, have been formed to supply their cattle with water. All the breeding and young cattle are carried on these expeditions, but a few laboring cattle and the buffaloes are left at home in charge of the women. During the whole time they are absent they never sleep in a hut; but wrapped up in their blankets and accompanied by their dogs, they lie down among the cattle within the folds, where they burn fires to keep away the tigers. This sometimes is not sufficient, and these ferocious animals break through the fence and kill or wound the cattle. The men have no firearms, the report of which would terrify the cattle. No thieves can annoy their black cattle, for they are too unruly to be driven by any person but their keepers.</p> <p>Their cattle have nothing to eat except what they can pick up in the wastes. Each day at sunrise they are driven out, as then the calves get all the milk, except a little used by the herdsmen; but near the villages they are milked, and each cow yields about two seers daily. They are indeed miserably lean, and at 20 years their ribs may be distinctly counted. The cattle are driven to water once a day, and the calves, when a month old, are driven to pasture with their mothers. The profit on a hundred cows is estimated at £43-13-0, or 45 per cent. on the original outlay.</p> <p>A <i>Golla</i> that is reckoned rich will have two hundred cows, thirty cow-buffaloes, fifty ewes, and a hundred she-goats; and will keep as many laboring oxen as will work three ploughs.</p> <p>The cattle in this country, as I have already mentioned, are milked by the men who carry the produce home to the women who prepare butter. The milk, on its arrival, is immediately boiled for at least an hour; but two or three hours are reckoned better. The earthen pots in which this is done are in general so nasty, that after this preparation no part of the produce of the dairy is tolerable to an European. The natives never use</p>

Ledger.

Mysore. (A. Kristnamangar and H. T. Pease.)	OXEN.
---	-------

raw milk, alleging that it has no flavour. The boiled milk that the family has not used is allowed to cool in the same vessel; and a little of the "tyre" or former day's milk, curdled, is added to promote its coagulation and acid fermentation. Next morning it has become tyre or coagulated acid milk. From the top of each potful 4 or 5 inches of tyre are taken and put into an earthen jar, where it is churned by turning round in it a split bamboo. This is done very expertly by a rope which, like that of a turner's lathe, is passed two or three times round the bamboo, and a quick motion in contrary direction is given by pulling first one end of the rope and then the other. After half an hour's churning some hot water is added and the operation is repeated for about half an hour more, when the butter forms. The native never uses butter, but prefers what is called "ghí," not only as it keeps better, but also as it has more taste and smell. In order to collect a sufficient quantity for making ghí, the butter is often kept for two or three days, and in that time a warm climate renders it highly rancid. When a sufficient quantity has been collected, it is melted in an earthen pot and boiled, until all the water mixed with the butter has been evaporated. It is then taken from the fire and a little tyre and salt or betel-leaf are added. It is kept in pots, has a very strong smell, and is best preserved from spoiling by a little tamarind and salt which, at any rate, enter into the dishes of all natives who can afford to use ghí. Buffaloes' milk yields more ghí than cows' milk, and cows' more than goats' milk.

CHITAL-
DROOG
CATTLE.

Allied Breed:

Pavagada and Midighesi Cattle.—These sub-breeds of the Chitaldroog cattle are of a smaller type. They are found all over the Pavagada and parts of the Maddagiri Taluks. The tracts are hilly and stony with extensive grazing. The breed is a cross between "Nadudana" and Golla cattle, brought into existence when the tribe settled in this region. They partake of the appearance and character of both the parent breeds. They are kept in "roppas" in herds, the annual production being large. They are fine limbed and very compact, with very hard and small hoofs which do not often require shoeing. Being active nardy and fleet-footed, they are much used in light travelling. Great numbers of these bullocks are purchased by trading Korchars, Lambani and Waddars, who take and sell them for agricultural purposes to raiyats in the Shimoga District, where they are known as Koracha "dana." Calves are not weaned till the cows run dry. The average market value of adult animals of this breed is as follows:—superior bull, R35 to R50; average bull, R30 to R35; superior cow, R25 to R35; average cow, R20 to R25.

MAHADESWARA BETTA BREED.

The breed derives its name from its chief market Mahadeswara betta in the Kollegal Taluk of the Coimbatore District, where two large cattle fairs are held in February and October, at which the cattle exhibited are

OXEN.	The Cattle of
MAHADES- WARA BETTA CATTLE.	mostly of this description. It is also called the <i>Betsal</i> or Cauvery breed, from its hilly home on either side of the Cauvery.
Where met with.	<p>The chief habitat of this race of cattle is the Kankanhalli Taluk of the Bangalore District and those taluks in the Coimbatore and Salem Districts which are divided from Mysore by the River Cauvery. The reason why these regions teem with great herds of cattle is that a wide expanse of forest land exists, not yet taken up for cultivation, with only patches of tillage in favored spots, which affords abundant pasture to the herds of cattle. The tracts are stony on the elevations and full of humus in the valleys. The forest growth being all deciduous the pasture lands are thoroughly baked in summer by the heat of the sun so peculiarly intense in the valleys of low hilly regions. Another reason, though one of secondary importance, is the presence of the Cauvery which affords cattle a perennial supply of water in seasons when the country generally is parched up. Beyond these jungle centres, but bordering on them, large herds of cattle are kept in villages commanding extensive pasture. Cows and bulls of this breed, in small numbers, purchased from the large herds, are taken away and reared in "<i>Maidan</i>" villages of the Kolar, Bangalore and Mysore Districts. It is from these breeding tracts that all the cattle of this kind are exported to other districts at various ages.</p> <p>The whole habitat of the breed is favorable to the development of bone. The cattle are more massive of bone and of larger build than those found in the neighbourhood though often wanting in their symmetry of form. Taking a well-developed adult bull of this breed as the type we find the following characteristic points:—</p> <p><i>Head</i>.—Short and stout with a thick muzzle and broad forehead.</p> <p><i>Horns</i>.—Not so uniform as those of the <i>Amrut Mahal</i> and allied breeds, but are more so than those of the village cattle. They are both stouter and shorter than the horns of the <i>Amrut Mahal</i> cattle, and have in some cases a rather sharp curve forward, towards the upper half of their length. They are usually black, sometimes being also of a light reddish-brown.</p> <p><i>Eyes</i>.—More or less prominent, black and gentle to dullness, with the surrounding skin sometimes overhanging them.</p> <p><i>Neck</i>.—Short and thick.</p> <p><i>Devulap</i>.—Thick, broad, hanging in folds, sometimes continued backwards to the sheath.</p> <p><i>Ears</i>.—Long and erect, though in some rare cases rather pendulous.</p> <p><i>Hump</i>.—Big and well-developed.</p> <p><i>Legs</i>.—Short and stout with thick bones.</p> <p><i>Feet</i>.—Big, the periphery being large, with equal or unequal halves; cleft rather wide. The hoofs are not so strong or hard as those of some other breeds; they never do for roads without shoeing, and are liable to get tender with hard work.</p> <p><i>The Back</i>.—Is never straight; but inclines from the croup to the "<i>Sali</i>" (known as "Cowlick"), and from there gently rising to the hump.</p>
Chief Features of the Breed	O. 551—94.

Mysore. (<i>A. Kristnamangar and H. T. Pease.</i>)	OXEN.
<p><i>Ribs.</i>—Well-rounded and strong.</p> <p><i>Sheath.</i>—Deeply pendulous.</p> <p><i>The Pelvic portion</i>—Droops from the croup to the tail. It is usually narrower than is consistent with symmetry.</p> <p><i>Tail.</i>—Long, thick at the root, and tapering rather abruptly. The tuft of hair at the tip is usually thick and long.</p> <p><i>Skin.</i>—Thick and loose, generally of a brown or almost black color, a jet black skin is rare.</p> <p><i>Color.</i>—The color of the hair in all pure specimens of the cows is either light, greyish, white or dark grey. Broken colors are not uncommon owing to the extensive mixture found in the herds. In size this breed is larger than the Amrut Mahal and kindred breeds. Bulls are generally dark grey with a black mantle; their sleepy eyes, when a photograph was taken in the midst of a crowd of spectators, prove their complete domestication. Under similar circumstances the <i>Amrut Mahal</i> bulls threatened to charge the photographer, camera and all.</p> <p>Cows, though smaller, both in length and height, than the bulls answer to the same description. The udder is fairly well developed, and in some cows the milk veins are prominent.</p> <p>The following measurements are given for reference :—</p>	<p>MAHADES- WARA BETTA CATTLE.</p> <p>Chief fea- tures of the breed.</p>

OXEN.		The Cattle of																						
Sex.	Age.	Height at shoulder.	Height at croup.	Height at elbow.	Length from poll to butlock.	Length of horn.	Length of ear.	Length of face.	Breadth of forehead.	Girth at chest.	Girth at abdomen.	Girth of forearm.	Girth of shank.	Length of neck.	Length of shank.	Color of skin.	Color of hair.	REMARKS.	C. V. D. measure-ment. Do.	Do.	Do.	C. V. D. measure-ment. Do.	C. V. D. measure-ment. Do.	
<i>Measurements, etc., of the Kankunahali Breed of Cattle.</i>																								
Bullock	3	50	50	28	66	5	9	18	8	62	70	11	6½	24	8	Black.	Chest-nut.	Black.	C. V. D. measure-ment. Do.	Do.	Do.	C. V. D. measure-ment. Do.	C. V. D. measure-ment. Do.	
Bullock	4	51	51	29	71	10	11	20	9	65	75	11	6	24	8	Do.	Black.	Do.	Do.	Do.	Do.	C. V. D. measure-ment. Do.	C. V. D. measure-ment. Do.	
Bullock	5	52	52	31	75	9	11	20	9½	66	75	12	7	28	9	Do.	Brown.	Do.	Do.	Do.	Do.	C. V. D. measure-ment. Do.	C. V. D. measure-ment. Do.	
Bullock	5	54	54	29	69	8	10	20	9	66	74	12	7	27	9	Do.	Chest-nut.	Do.	Do.	Do.	Do.	C. V. D. measure-ment. Do.	C. V. D. measure-ment. Do.	
<i>Mahadeswaran Hill Breed.</i>																								
Bullocks	4	53	55	30	78	16	10	21	9	68	79	12	7	28	9	Black.	Brown.	Black.	C. V. D. measure-ment. Do.	Do.	Do.	C. V. D. measure-ment. Do.	C. V. D. measure-ment. Do.	
Bullock	5	52	53	29	75	15	10	20	9	66	78	12	7	27½	8	Do.	Green.	Do.	Do.	Do.	Do.	C. V. D. measure-ment. Do.	C. V. D. measure-ment. Do.	
Bull	5	57	58	...	78	14	11	21½	9	80	77	14	8	18	10	...	...	...	...	...	...	C. V. D. measure-ment. Do.	C. V. D. measure-ment. Do.
Bull	5	58	59	...	79	14	10	21	9	79	79	13	8	17	8½	...	...	...	...	...	...	C. V. D. measure-ment. Do.	C. V. D. measure-ment. Do.
Cow	8	48	51	...	68	21	9	20	8	58	62	10	6	14	8	...	...	...	...	...	...	C. V. D. measure-ment. Do.	C. V. D. measure-ment. Do.
Cow	6	47	51	...	67	18	9	20	8	60	64	11	6½	18	8	Black.	Green.	Black.	C. V. D. measure-ment. Do.	Do.	Do.	C. V. D. measure-ment. Do.	C. V. D. measure-ment. Do.	

Mysore. (A. Kristnamangar and H. T. Pease.)	OXEN.
<p>Large herds of these cattle invariably have their own breeding bulls which are attached to and always move with them. The herds are kept in "roppas" in the jungle or near the villages. They are maintained purely on grazing when in "roppas." Breeding is allowed irrespective of age. The majority of the cows come into season about the beginning of their 5th year, though some drop their first calf even in the 4th year. No special food is ever given to animals in the breeding season, which is usually October and November. Where good bulls are available, all the bull-calves are castrated. Most bull-calves in "roppas" are sold after four months, being even weaned for the purpose. Cow calves remain in the herds and suck till the mother runs dry. Cows are not milked in "roppas" except for the consumption of the attendants, and when they have valuable calves they are not milked even in villages. Late castration is the rule.</p>	<p>MAHADESWARA BETTA CATTLE.</p>
<p>Cattle of this breed are generally gentle and docile, though they seem to be somewhat shy and unmanageable in their "roppas." They are easily tame, and, when accustomed to men, obey even young boys who are able to feed and lead them. In the jungly tracts of Kankanhalli and its neighbourhood some graziers in charge of the herds resort to smoking their cattle several times a year. The object of smoking is stated to be (1) to protect them against infectious diseases, and (2) to improve their mettle. Smoking is usually done by burning the compounds of various drugs (always kept a secret) in a hole made to the windward of the "roppa," so that all the cattle inhale the smoke, the fuel used being the wood <i>Cassia auriculata</i>.</p>	<p>Breeding.</p>
<p>The cows are better milkers than those of other breeds in the Province though the yield is poor. It improves when they are kept singly in villages under careful home-feeding. Though inferior to the <i>Amrut Mahal</i> and kindred cattle in mettle and speed, this is the most useful and hard working breed in the Province. Being of a heavy build, the bullocks are not fast trotters, but from their general tractability and capacity for heavy draught they are in great demand. They are invariably seen in carts all over the Districts, while over more than half the Province they perform every kind of hard work. No other breed is so extensively distributed and employed. Next only to "<i>Nadudana</i>" this is numerically the largest breed in Mysore. The annual production is large and sufficient to supply draught cattle to nearly two-thirds of Mysore, to almost all the Districts south of Cuddapah and parts of the Bellary and Anantapur Districts in the Madras Presidency as also the District of Dharwar in Bombay. The average market value of the animals near their place of production is as follows for adult animals of five years:—First quality bull, ₹70 to ₹100; average bull (for work), ₹40 to ₹70; best (breeding) cow, ₹50 to ₹70; average cow (for work), ₹30 to ₹50; bull-calves of one year, from ₹20 to ₹35; cow-calves are not often sold. A higher price is paid for bulls of grey color, having light blue sides and somewhat dark blue on the head, hump, and fore and hind quarters.</p>	<p>Disposition.</p>
	<p>General Description.</p>
	<p>Prices.</p>

OXEN.	The Cattle of
MAHADES- WARA BETTA CATTLE.	ALLIED CATTLE.
Allied Breeds.	<p><i>Masti and Nundi "dana."</i>—Allied to the <i>Mahadeswara betta</i> breed but modified more or less considerably, is that breed of cattle which is found in the neighbourhood of Dhankanikote and Hosur in the Salem District, and in the Bowringpet, Malur and Anekal Taluks of the Mysore Province. Their long head with somewhat thin and gently curved horns, their thin dewlap and sheath and their symmetrical shape distinguish them from pure <i>Mahadeswara betta</i> cattle. In the neighbourhood of their breeding centres they are known as <i>Masti "dana,"</i> being bred in great numbers around Masti in the Malur Taluk of the Kolar District. In distant parts they are known as <i>Nundi "dana,"</i> being sold at the Nundi cattle fair in the Chikballapur Taluk of the Kolar District.</p>
Points of <i>Nadudana</i> or local Breed.	<p>"NADUDANA" OR LOCAL BREED.</p> <p>Little is known of the early history of these cattle. They seem to have descended from the indigenous cattle of the aboriginal inhabitants of the country and existed anterior to the importation of every variety of "<i>Dodadana</i>," or before any idea of improving cattle was at all entertained by the people. Their existence at the present day as a distinct breed may be said to be due to neglect in breeding, all stunted products falling under the denomination of '<i>Nadudana</i>.' They form the great bulk of the live-stock of the Province, being found wherever man has settled.</p> <p><i>Head.</i>—Short, often with a flat but symmetrical forehead.</p> <p><i>Horns.</i>—Of every shape and color, varying from a stumpy thick to a lean long type.</p> <p><i>Eyes.</i>—Small and active.</p> <p><i>Neck.</i>—Of proportionate length, but in some rather thin.</p> <p><i>Ears.</i>—Small and erect.</p> <p><i>Dewlap.</i>—Thin and short.</p> <p><i>Hump.</i>—Fairly developed.</p> <p><i>Legs.</i>—Proportionate; in some instances somewhat long.</p> <p><i>Feet.</i>—Small with equal or unequal halves, the cleft being usually narrow and color varied, though black prevails.</p> <p><i>Back.</i>—Varying in breadth and formation.</p> <p><i>Ribs.</i>—For the most part well rounded, though flat in some specimens.</p> <p><i>Pelvis.</i>—Variously drooping.</p> <p><i>Tail.</i>—Varying both in length and thickness.</p> <p><i>Shoulders and Thighs.</i>—Proportionate and well-made.</p> <p><i>Sheath.</i>—Rarely pendulous.</p> <p><i>Color.</i>—Black color of skin prevails, though other colors are not unusual. The hair is of different colors—red, black, grey, white, brown or fawn or shades of these. Broken colors are very common.</p> <p><i>Size.</i>—Small.</p>

Ledger.

Mysore. (A. Kristnamangar and H. T. Pease.)	OXEN.
<p><i>Form and Shape.</i>—Much greater diversity of form and shape is found among village cattle than in any well-defined superior breeds which at once strike the observer by their uniformity. <i>Village</i> cattle are on the whole compactly made and symmetrical, though ill-proportioned animals are by no means rare.</p> <p>They are generally ill-fed except where natural pasturage is abundant. In the hot weather they suffer and sometimes numbers die of starvation. In the best of seasons the quantity of straw that is grown is less than what is needed if cattle are to be fully fed. There is no spectacle more pitiful than a collection of half-starved village cattle in seasons of drought. Their low condition and weakness render them peculiarly liable to epidemic diseases of various descriptions. There is hardly a village which does not periodically sustain extensive devastation of cattle. In localities where large extents of lowland tracts irrigated by tanks or channels exist, cattle get some grazable forage in the dry weather and do not look the mere skin-and-bone which they do in places where such advantages are entirely absent. Where large reservoirs and good springs abound, cattle get a good drink of water in the dry weather, but in the large jungle pastures and in many villages of every district scarcity of water often prevails from which cattle suffer as much as from the scantiness of fodder. The little water pools and reservoirs which generally form the sole source of water for cattle in villages gradually becomes concentrated, soiled by the faeces of the cattle, and charged with the smell of their urine.</p> <p>Cattle of this breed are generally docile. Those bred in large herds in "<i>ropas</i>" like "<i>Dodda dana</i>," as in the Pavagada Taluk, are fiery in temper and very shy. It is not uncommon to find such specimens even in purely village-bred animals of this class.</p> <p>These are the most serviceable animals bred in the Province, inasmuch as they perform more than 75 per cent. of the total agricultural work of the country, and a greater part of light transport-cattle used as beasts of burden are drawn from this breed. About a third of the dairy produce is produced by them (the other two-thirds being mainly contributed by buffaloes), while nearly the whole of beef supplied to the army and beef-consuming classes is derived from them. The average market value of cattle of this breed is—very good bull, R45; average bull, R30; very good cow, R25; average cow, R15.</p>	<p>NADUDANA CATTLE.</p> <p>Conditions under which they live predispose them to disease.</p> <p>Temper.</p> <p>Usefulness of the breed.</p> <p>Prices.</p>
<p>ALLIED CATTLE.</p> <p><i>Lingadaballi Cattle.</i>—The cattle of Lingadaballi and a few other villages forming a group in the Tarikere Taluk are highly priced in that part of the country. Though they are but village cattle, they differ from the generality of the breed in their build, strength and endurance. They are bigger, more bony and compact in build, with quick and intelligent eyes; hair thin and short, and tail whip-like with a poor tuft of hair at the tip. Their horns are not so well shaped. The legs are</p>	

OXEN.	The Cattle of
<p>NADUDANA CATTLE.</p> <p>Allied Breeds.</p>	<p>stout and the hoofs hard, but much bigger than what symmetry warrants. The cows are noted for their rich milk. They are well adapted for heavy draught, and in former times are said to have been of great service to the Pallegars of Tarikere as beasts of burden from hill fort to hill fort. Efforts are now successfully being made to improve this breed by an admixture of the <i>Amrut Mahal</i>.</p> <p><i>Pavagada and Midighesi Cattle.</i>—Pavagada and Midighesi cattle, which are only village breeds improved, have already been noticed.</p> <p><i>Metikuppe Cattle.</i>—These are village cattle crossed by <i>Amrut Mahal</i> bulls of herds quartered in the vicinity for the sake of the hot season pasturage of the south-west jungles of the Heggadadevankoté and Hunsur Taluks. They differ very little from ordinary village cattle in appearance, but possess in a certain degree the spirit and power of endurance of the <i>Amrut Mahal</i> cattle and like them are of fiery temper.</p> <p>Besides the above well-known varieties of village cattle, many other less important known and recognized sub-breeds exist in different parts. Of all of them this may generally be observed, that while their ordinary characteristics are the same diminutive size, diversity of form, variety of horns, and broken colors, any superior points found in them may be traced to the influence of local conditions and strains of those higher breeds with which they may have been brought into contact.</p>

Cattle Fairs held in Mysore.

District and Tahsil.	Name of Place or Village.	Month.	Approximate number of Cattle.	Different breeds brought for sale.	REMARKS.
Kolar District.					
Kolar.	Vakkaleri.	February.	16,000		
	Venarasi.	April.	15,000		
	Marar.	April.	10,000		
	Siddaghatta.	February.	4,000		
	Gowringpet.	May.	5,000		
	Torannahalli.	February.	5,000		
	Chengababali.	April.	4,000		
	Chengababali.	April.	10,000		
	Bhivattamma betta.	April.	15,000		
	Muthibagal.	March.	15,000		
	Yellur.	March.	15,000		
	Chikkabapur.	March.	15,000		
	Nandi.	March.	15,000		
Tumkur District.					
Koratogere.	Srikrumarehalli.	January.	3,000		
Pargala.	Nagaimadith.	January.	3,000		
Siamoga District.					
Honnali.	Rampur.	February.	6,000		
Mysore District.					
Kudalore.	Chunchankattē.	January.	7,000		
Bangalore District.					
Nelamangala.	Singapore.	March or April.	5,000		
Hidkote.	Gulabab.	March.	5,000		
Chikhalapur.	Jadikerahalli.	January.	5,000		
Magadi.	Srinayakanavē.	January.	50,000		
	Magadi.	April.	5,000		
	Magadi.	April.	5,000		

O. 551-94.

OXEN.		The Cattle of Mysore.																		
Sex.	Age.	Height at shoulder.	Height at croup.	Height at elbow.	Length.	Length of horn.	Length of ear.	Length of face.	Breadth of forehead.	Girth at chest.	Girth at abdomen.	Girth of forearm.	Girth of shank.	Length of neck.	Length of shank.	Color of skin.	Color of hair.	REMARKS.	Measurements.	
																			AMRUT MAHAL and OTHER CATTLE.	
Bull	6	53½	54½	...	78	18	9	20	9	68	69	13	7	16	8	Black. Do.	Slate. Grey.			
Cow	8	40½	46	...	67	21	8	17	9	59	61	9½	5½	17						
Bull	4	48	51	...	69	17	10	19	8	63	66	11	6	17	8	Various.				
Bull	7	48	49	...	66	21	8	17	7	60	69	10	6	16	7					
Bull	10	44	45	...	61	17	8	17	7	54	54	9	5	16	7					
Cow	4	44	43	...	61	9	8	16	6	56	60	8		13	8					
Bull	5½	56½	57½	...	79	16	10	21	8	77	79	14	7	18	8	Brown.	Green.			
Bull	4	50	56	...	72	14	9	19	9	66	69	12	7	18	8	Brown.	Green.			
Bull	5	45	45	...	60	11	9	16	7	59	57	9	5	16	7	Brown.	Green.			
Bull	8	50	51	...	71	17	9	17	7½	65	67	11	7	16	7	Brown.	Green.			

G. I. C. P. O. No. 401 R. & A.—8-15-96.—2,100.—R. H.

Map of the
YSORE PROVINCE

THE APPROXIMATE DISTRIBUTION
OF BREEDS OF CATTLE.

7



All communications regarding THE AGRICULTURAL LEDGER should be addressed to the Editor, Dr. George Watt, Reporter on Economic Products to the Government of India, Calcutta.

The objects of this publication (as already stated) are to gradually develop and perfect our knowledge of Indian Agricultural and economic questions. Contributions or corrections and additions will therefore be most welcome.

In order to preserve a necessary relation to the various Departments of Government, contributions will be classified and numbered under certain series. Thus, for example, papers on Veterinary subjects will be registered under the Veterinary Series. Those on Forestry in the Forest Series. Papers of more direct Agricultural or Industrial interest will be grouped according as the products dealt with belong to the Vegetable or Animal Kingdom. In a like manner, contributions on Mineral and Metallic subjects will be registered under the Mineral Series.

This sheet and the title-page may be removed when the subject-matter is filed in its proper place, according to the letter and number shown at the bottom of each page.